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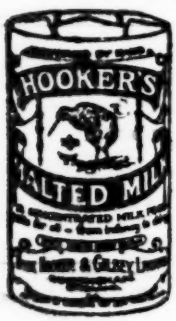

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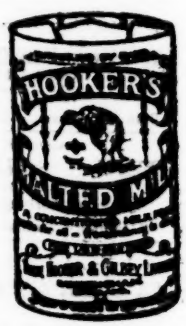

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Notes ON MALARIA

FOR OFFICERS AND MEN.[1]

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LARGE portions of South Africa are free from malaria, or were before the war, and many South Africans know nothing of the disease. Men of the Cape and Rhodesian regiments who had seen service in German South-West Africa, and knew only one enemy, found that in coming to East Africa they were strong men no longer, but had another and unseen enemy to contend with who was stronger than the Hun.

Tropical East Africa is by no means an unhealthy region as regions go in the tropics, not nearly so malarial, in fact, as most parts of tropical West Africa. Persons who libel the climate of East Africa forget that malaria is a preventable epidemic disease, and that the greater the number of whites in any given area the greater is likely to be the prevalence of any epidemic and the quicker is it likely to spread, while the cases owing to multiple re-infection become more severe. To forget these facts under the conditions of military service may mean the loss of very many men.

Particularly is it necessary to remember that malaria is a preventable disease. Twenty years ago the cause of malarial fever or "ague" was popularly believed to be exposure to night air, gases from decaying vegetation, or breathing the misty vapours rising from marshes and swamps. Since then, however, the study of tropical medicine has advanced, and the necessity for the better security of life in the tropics, especially in tropical Africa, has become more urgent, with the result that malaria, the most important of all diseases affecting Europeans in hot climates, has for many years absorbed the attention of French, Italian, and English scientists to such purpose that there is now scarcely another disease the cause, prevention, and treatment of which are better understood by those who have worked at the subject.

It is therefore incumbent upon every man in a malarial region, more particularly when engaged in military operations, in order to avoid the disease, or at least to understand the necessity for the precautions imposed upon him, to be conversant with the main facts in connexion with its transmission from man to man, not only for his own sake but for that of his comrades, and in this instance the welfare and greater efficiency of the East African Expeditionary Force.

With this aim in view the following facts have been collected for the instruction of officers and men.

General.

1. Malaria is a parasitic, infectious, epidemic disease, conveyed from one person to another by the agency of mosquitoes.

2. The microscopic parasite causing it lives and develops in the corpuscles of the blood of man, and in the body of the mosquito.

3. There is no evidence to show that it can exist in any other animal, or possibility of its existing free in nature.

4. When blood containing the parasite is sucked up by the mosquito from a person recovering from an attack of "fever," the parasites develop and multiply in the body of the insect, and after three to five days may be injected by it through the skin into the blood of other men, causing, after another interval of eight to ten days, all the train of symptoms known as malarial fever.

Explanatory.

5. *The malaria parasite.*—Shortly after the mosquito bite and the arrival of the parasites in the blood stream they enter and commence development within the corpuscles.

6. After an interval of a few days the parasites have so multiplied in the blood of the person bitten that an attack of fever sets in, the length of the interval mainly depending upon the number of bites, the number of parasites injected, and the temperature prevailing.

7. The fever may therefore not commence until the person is many miles from where he was bitten.

8. After an untreated attack has run its course the fever subsides, and the microscope no longer shows active parasites within the corpuscles, but there still remain in the body two forms of the parasites:—
(*a*) Latent or resting forms in the liver, spleen, &c.
(*b*) Specialised crescentic forms in the general circulation.

9. (*a*) The latent or resting forms retire after the attack from the general circulation and remain inactive in the liver, spleen, &c., until perhaps the treatment is relaxed, or till such time as the resisting power of the individual is lessened by chill, sun exposure, exhaustion or other cause, when they may return to the circulation and again become active within the corpuscles, producing a relapse and a return of the patient to hospital.

10. The relapse has most of the features of the primary attack with all its train of symptoms and ill-effects.

11. (*b*) The crescentic bodies are not formed until the attack has run its course.

12. They remain in the general circulation beneath the skin for weeks, causing no symptoms, but when sucked into the stomach of certain species of mosquitoes they at once become active, and after certain changes pass from the stomach contents into the stomach wall, multiply enormously, and eventually invade the salivary glands of the insect, from whence they are injected during the act of sucking into the blood of man as fever-causing parasites. (The mosquito has the power at the moment of sucking of injecting through a special tube in its proboscis an irritating salivary secretion probably for the purpose of preventing premature coagulation of the blood.)

13. Only the crescentic bodies are capable of infecting, and developing in, the mosquito, and not the active forms of the parasite as seen in the corpuscles during the attack.

14. If after some weeks the crescentic body has not found its way to the mosquito's stomach it may die, or it may retire from the general circulation to the liver or spleen, where it can remain without causing symptoms for a long period. But any severe constitutional disturbance, such as might be caused by the removal of the individual from a warm to a cold climate, may result not only in these bodies reappearing in the circulation but in their having the power to multiply and produce a crop of active fever-causing parasites, and what is known as a recurrent attack, even after the lapse of two or three years.

15. As in the case of the relapse, the recurrent attack has most of the features of the primary attack, and anyone returning, say, to South Africa and suffering from a recurrent attack, even in a district hitherto free from malaria and years after his return, may become a danger to his friends, or even the nucleus of an epidemic, if the right kind of mosquito happens to be an inhabitant of the neighbourhood and if mosquito net precautions are not thorough.

16. *The mosquito.*—Only the female mosquito has the power of sucking blood, the male subsisting upon the juice of plants, fruit, &c.

17. Not all species of mosquitoes can convey malaria. The majority of the common species are harmless (except those which transmit yellow fever, elephantiasis, &c.).

18. The few species which are capable of conveying it belong to the class *Anopheline* all of which are fragile insects not easily seen, comparatively silent, and whose bite leaves little irritation

19. It is therefore unwise to commit oneself to the remark, so frequently heard, that there are no mosquitoes in a particular place or camp, without the opinion of an expert.

20. All mosquitoes lay their eggs upon water, and the larval and pupal stages of their life are spent in the water. They wriggle to the surface periodically to breathe.

21. When the pupa is ready to change into the mature insect it rises to the surface, the pupa-case splits down the back, the mosquito emerges, and, after an interval for its newly-formed wings to harden, it flies away.

22. If a thin layer of kerosene oil be spread upon the surface of the water neither larvæ nor pupæ can get their breathing tubes to the surface, and all die of suffocation, a never-failing and ever ready method of preventing mosquitoes hatching out of receptacles which cannot easily be emptied of water.

23. Where there is no water there can be no mosquitoes.

24. No other insect can convey malaria. Where there is malaria there must be anopheline mosquitoes.

25. It does not follow that because there are anopheline mosquitoes there must be malaria. The insects though present may not have been infected and therefore harmless.

26. One bite is sufficient to cause an attack and one infected mosquito may give malaria to several persons in one night.

27. Those species of anopheline mosquitoes which convey malaria are not usually found away from human habitations, or if found are not likely to be infected. Consequently men on piquet duty, or in bivouac or temporary camp, although severely bitten by mosquitoes, often run less risk of malaria than those in camps or hospitals on lines of communication, where numbers of men who have suffered from malaria are congregated and where every anopheline mosquito is likely to be infected.

28. *The mosquito net.*—The segregation of the individual beneath an efficient net at night is by far the most important and effective means, not only of guarding against a primary attack, but of preventing infection being carried from the sick person to healthy persons.

29. Owing to the development of crescentic carrier bodies after and not during the continuance of the fever the use of an efficient mosquito net is far more important to the welfare of the community after than before the attack.

30. One person or even a baby with crescentic bodies in his blood sleeping without a mosquito net, or with one that is defective, may be and often is the nucleus of an epidemic.

31. Hence arises the danger of sleeping near a native village, because in a malarial locality a large percentage of the youngest children have active parasites and crescentic bodies in their blood and yet play about without showing symptoms of fever.

32. Adult natives, on the other hand, in a malarial locality are not usually a danger, for having suffered severely in early childhood they have acquired a partial immunity, and in consequence suffer little from malaria.

33. Strangers, however, from upland regions where there is no malaria, not having suffered from the disease in childhood, have acquired no immunity, and are soon likely to be infected on reaching a malarial district at a lower level.

34. Indians rarely seem to acquire any immunity, and are very susceptible to malaria. Their proximity is a danger to Europeans.

[1] These notes amount to an amplified syllabus of lectures delivered in the field to troops in East Africa. Major Christy's practice was to lecture for half an hour and to answer questions for another half-hour. He obtained very encouraging results.

35. A mosquito net to be effective should be large enough to prevent the arms and knees being bitten through it and also to allow of its being tucked in all round.

36. An efficient mosquito net properly used is a protection in tropical Africa against attacks from many harmful insects and animals besides mosquitoes. For example: Flies which lay their eggs in the skin or in the nose at night, the maggots hatched from which sometimes cause irreparable injury or even death; scorpions; several species of dangerous centipedes; poisonous ants; beetles of many sorts which injure by biting, ejecting poisons, or by entering the ears; ticks, whose bite conveys serious fever; snakes, lizards, rats, &c., and, by means of its calico top, from dust and dirt dropped from above in hut or tent, or from heavy dew when sleeping in the open.

37. The lightest and smallest net which can be made serviceable under all circumstances, whether in hospital, clearing station, camp or bivouac, is one with calico top 5 feet 6 inches long by 2 feet broad and with sides 3 feet deep (2 feet of netting and 1 foot of calico tuck-in). At each four top corners are double taper, 8 inches long, for fixing the net to its supports.

38. The latest approved ordnance pattern is a rectangular net of the above dimensions. To be effective it must be suspended by means of its corner tapes inside its supporting sticks, otherwise it cannot be tucked in. On no account should it be placed over its supports nor allowed to sag or hang loose.

39. For military purposes the mosquito net should of course be khaki, or any other less conspicuous colour than white, but khaki netting being unobtainable it is advisable for each man for his own safety to dye his net with Condy's fluid, coffee, or other colouring agent.

40. There are other methods of individual segregation than by the mosquito net. The best of these is by the use of "Bamber oil," a mosquito lotion used extensively by coolies on the plantations in Ceylon, &c.

Its composition is as follows:—

Citronella oil (not lemon-grass oil)	1½ parts.
Kerosene (paraffin) oil	1 part.
Coconut oil	2 parts.

To which is added carbolic acid 1 per cent. Its efficacy lasts from four to six hours, sufficient to give a night's sleep in comparative safety when a mosquito net is not available or cannot be used.

41. *Quinine.*—Quinine is the only drug in the world we know of which will kill the malaria parasite, and consequently quinine is the only drug of any use as a prophylactic against malaria—that is, for the prevention of primary attacks—and it is the only medicine which will cure the disease.

42. Quinine being absorbed into the blood kills the parasite freshly injected by the mosquito, but when after three or four hours these have entered the corpuscles quinine has less effect upon them.

43. Quinine should therefore be taken early after any risk has been incurred, but as the exact time of the risk can rarely be determined the best way to accomplish this is to take it frequently.

44. A daily dose of grains 5 after the evening meal is for many reasons the wisest procedure.

45. A grains 5 dose taken at 10 P.M. will kill any parasites which may have been injected by mosquitoes during the evening, and will remain in the blood long enough to put out of action any that may be introduced up to 6 A.M. next morning. The hours of daylight need not, of course, be provided for.

46. If quinine is taken only on Saturdays and Sundays a person may be bitten by infected mosquitoes on the Monday and the parasites injected may have so multiplied in the body by the time Saturday comes round again that an attack of fever is unavoidable.

47. Quinine alone will not reduce the chances of infection more than perhaps 25 or 30 per cent., but quinine plus the intelligent use of an efficient mosquito net should reduce those chances by at least 90 per cent.

48. Quinine is the only specific for malaria. It cuts short the attack by killing the young parasites as each successive crop develops in the blood.

49. If taken in sufficient quantities during the attack it will prevent the formation of the crescentic bodies, which once formed constitute the convalescing patient a danger to his fellows, and in spite of quinine may remain in the body for a long period.

50. A slight attack is just as dangerous in this respect as a severe one, and a person refusing to go sick "for a little fever" and neglecting to take quinine deserves to be severely dealt with.

51. If continued after the attack in sufficient doses daily it will account for all the resting, latent forms of the parasite in the spleen, &c., prevent relapses, and bring about a permanent cure, but the mosquito-net protection must be efficient and fresh attacks from bites of infected mosquitoes not allowed to supervene.

52. A good method of quinine after-treatment—that is, from the date of the subsidence of the fever—is as follows:—

At least 20 grains daily for 2 weeks.			
15	,,	2	,,
5	,,	,, 2 months.	

53. With the quinine may be combined, if necessary, iron and arsenic tonics as ordered by the medical officer.

54. Opinions regarding the after-treatment by quinine frequently differ as to when and how the drug should be taken, but the main point to realise is that the dosage should be daily for three months and the daily dose sufficiently large during the first month of the three. If a relapse should occur the three months' treatment must be commenced afresh.

55. Neglect of quinine after the attack will certainly result in a relapse, which may mean the development of additional resting forms and crescentic bodies, as well as the further decrease of the resisting power of the body, tending to other relapses and general debility.

56. The deafness and other slight effects of taking quinine are not permanent. However unpleasant the effects may be they are infinitely preferable to the risk of permanent inefficiency or loss of life.

57. Although the taking of quinine has in some cases resulted in the passing of black water unaccompanied by any fever, quinine is certainly not the cause of blackwater fever.

58. Although we may not know precisely what is the cause of this disease, there is plenty of evidence to show that malaria is the initial factor. To prevent malaria by the careful use of a net, or to bring about a permanent cure by energetic after-treatment with quinine, is the only way of avoiding risk of blackwater fever.

In THE LANCET there have been published recently the notes of cases of malaria occurring in England, and in one district these cases have been quite numerous, so that notification has been enjoined. There is no statement in the above notes, which were written originally for the troops in East Africa, which does not apply equally to any condition arising in the home country, but it should be remembered that atmospheric temperature is an important factor in the propagation of malaria. In a temperate climate not only is the parasite in man retarded in its development in the blood, but its development in the mosquito is also delayed. Moreover, the mosquito itself is disinclined to suck blood till the temperature rises to what in England is looked upon as tropical heat. We are familiar with the reports in the lay press of the widely spread occurrence of mosquitoes whenever there is an unusually high summer temperature. These reports are written in ignorance of the fact that the gnat is always with us, but only bites in what is regarded in this country as very hot weather. A simple form of malaria was very common at one time in the eastern counties, and might become so again, though the severe malaria of the tropics is not likely to be prevalent.

NOTES ON THE

TREATMENT OF SUBTERTIAN CEREBRAL MALARIA WITH QUININE AND GALYL.

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SALVARSAN and neosalvarsan have been used to a considerable extent during the last six or seven years in the treatment of malaria. Most observers are agreed that these drugs, especially when associated with quinine, are of value in infections with the benign tertian and quartan parasites, but are of little value against infections with the *Plasmodium laverani*. Although quinine alone may justly be termed a specific in the treatment of most types of malaria the death-rate from malignant subtertian malaria is yet sufficiently high to stimulate further effort to find an even more efficient therapy.

Cases Treated with Quinine and Galyl Combined.

The following six cases were treated with a combination of quinine and galyl.

CASE 1.—Private C, aged 31, was admitted to base hospital on Sept. 22nd, 1916. He had reported sick on Sept. 18th complaining of headache, vomiting, and "the shivers." He stated that for the previous three months he had been having attacks of shivering and sweating at irregular intervals. On admission to hospital his general condition was good, his temperature was normal, and his spleen extended half an inch below the costal margin. He was treated with 20 grains of quinine sulphate three times a day by the mouth. He felt quite well and his temperature remained normal until the morning of Sept. 25th. On that date his temperature rose to 100° F., and remained up all day.

On the morning of the 26th the temperature had fallen to normal, but rose again in the evening to 101°, and the patient felt sick and vomited. An injection of 20 grains of quinine bihydrochloride was administered intramuscularly.

On the morning of the 27th another injection of 20 grains of quinine was given intramuscularly. His temperature was normal, and did not rise above normal throughout the day. At noon the patient refused his food, and looked strange; at 3 P.M. he was found to have complete paralysis of the muscles of both sides of the tongue, of the pterygoids, and of the masseters. There also appeared to be some weakness of the external recti. There was no paralysis of the limbs, or alteration of the superficial or deep reflexes. The patient was quite conscious and could carry out directions as to the movements of his limbs; the fundi oculorum were normal. A blood film showed the presence of numerous subtertian rings and crescents. He was given an intravenous injection of 0·8 gm. of quinine bihydrochloride. At 8 P.M. the patient's condition was unchanged, except that he now appeared to have some difficulty in understanding what was said to him. There was a definite internal strabismus of the left eye; a further 0·8 gm. of quinine was administered intravenously.

On the morning of the 28th the condition of the patient was much improved. He could open his mouth, protrude his tongue, and articulate slowly. He had some difficulty in swallowing, as fluids tended to regurgitate through the nose. There was still defective movement of both eyes outwards. In the afternoon his temperature rose to 100°. On this date he was given two intravenous injections of quinine bihydrochloride, 0·8 gm. each.

On the morning of the 29th his condition was much worse. There was complete paralysis of the tongue, the palate, and the muscles of mastication. There was also complete ophthalmoplegia, and it was doubtful whether the patient understood what was said to him. At 9 A.M. he received a further 0·8 gm. of quinine bihydrochloride intravenously. At 11 A.M., as there was no improvement in his condition, he was given 0·3 gm. of galyl intravenously. At 3 P.M. the patient was much improved. He could then protrude his tongue, move his jaw, talk slowly but quite intelligently, swallow slowly, and move his eyes. At 9 P.M. he was given a further 0·8 gm. of quinine intravenously.

On the 30th the patient's condition had continued to improve. There was still some dysarthria, but he was able to swallow without difficulty. He was put on 20 grains of quinine sulphate three times a day by mouth. The improvement steadily continued, but on Oct. 1st, as the temperature still rose to 100°, he was given 0·2 gm. of galyl intravenously. The temperature fell that night and remained subnormal during the rest of his stay in hospital. He showed no further symptoms and was transferred to hospital ship on Oct. 18th, when there was no evidence of organic nervous disease, and no malarial parasites could be found in the blood.

CASE 2.—Sapper R., aged 33, was admitted to base hospital on Oct. 4th, 1916. On admission the patient's general condition was bad and the temperature was 103° F. He showed no evidence of any local lesion of the nervous system. A blood film showed the presence of numerous subtertian malarial parasites. He was given 0·8 gm. of quinine bihydrochloride intravenously. On the morning of the 5th his temperature was subnormal, but his general condition was very poor. He was again given 0·8 gm. of quinine intravenously, and at 2 P.M. 20 grains of quinine sulphate by the mouth. In the afternoon the patient developed marked dysarthria and difficulty in swallowing. The speech was quite unintelligible. The movements of the tongue and palate were present but much impaired. The patient's mental condition was not affected, and there was no paralysis of the limbs or alteration in the superficial or deep reflexes. At 6 P.M. he received 0·4 gm. of galyl intravenously. On the 6th the patient's general condition was much improved, and beyond slight dysarthria, which rapidly passed off, he showed no evidence of local disease of the nervous system. He was then treated with quinine intramuscularly and later by the mouth, and rapidly became convalescent. He was transferred to hospital ship on Oct. 21st without any evidence of organic nervous disease.

CASE 3.—Private B., aged 48, was admitted to base hospital on the night of Oct. 7th complaining of headache and general weakness. On admission his temperature was 103° F., but fell to 99° on the morning of Oct. 8th. His general condition was fair and his spleen extended about one inch below the costal margin. He was treated with 20 grains of quinine sulphate three times a day by the mouth. He took his dinner at noon on the 8th without discomfort, but at 4 P.M. it was found that he was unable to swallow his tea, and he rapidly became unconscious. A blood film showed the presence of numerous subtertian rings and crescents. When seen at 5 P.M. he was lying in a semi-conscious condition, and did not pay any attention to what was said to him. The conjunctival reflex was present and the superficial and deep reflexes were normal. The unconsciousness rapidly deepened and he could not be roused by any stimulation. He received 0·8 gm. of quinine bihydrochloride at 5 P.M., 7 P.M., and 10 P.M. At 11 P.M. his condition was unchanged except that his pulse was failing. He then received 0·4 gm. of galyl intravenously. When seen at 6 A.M. next morning he was quite conscious, able to answer questions slowly and intelligently and swallow. His temperature was subnormal and remained so for the remainder of his stay in hospital. A blood film showed the presence of scanty subtertian crescents up to Oct. 15th, but he showed no further symptoms and was transferred to hospital ship on the 22nd.

CASE 4.—Private C., aged 26, was admitted to the base hospital on Oct. 10th. On admission the patient's general condition was poor, his temperature was 99° F., and his spleen extended about one inch below the costal margin. A blood film showed the presence of rings and crescents. He tended to be drowsy, but answered questions quite intelligently, and had no complaints. He was given 0·8 gm. of quinine bihydrochloride intravenously. On the morning of the 11th the patient's general condition was worse, he was more drowsy, and answered questions with difficulty. The pulse was 120 per minute and feeble. He received 15 grains of quinine bihydrochloride intramuscularly. At 3.30 P.M. his condition suddenly became much worse, his breathing became stertorous, and his pulse imperceptible; he lay moaning incessantly and rolling his head from side to side. There was no paralysis and his superficial and deep reflexes were normal. His temperature was subnormal. At 4 P.M. he became violent and lay on his left side in the typical attitude of cerebral irritation. He violently resisted any interference with this position. He received 0·4 gm. of galyl intravenously. At 9 P.M. his condition had definitely improved. He had slept for two hours and his pulse was better. At 1 A.M. on the 12th he again became rather excited and was given 1 150 grain of hyoscine. After this he slept, and when he awoke was rational, though weak. From this date he rapidly and steadily improved and on the 22nd was transferred to hospital ship without presenting any further local symptoms.

CASE 5.—Private L., aged 20, was admitted to the base hospital on Oct. 15th, 1916, with a diagnosis of malaria. On admission his temperature was normal, and he presented no local symptoms. His spleen extended half an inch below the costal margin. He had never suffered from fits nor had any of his family done so. On Oct. 16th, whilst in the latrine, he suddenly developed an epileptiform fit. After having been brought back to the ward, he was in a very confused condition, and paid no attention to any questions, but constantly attempted to get out of bed. The blood film did not show any malarial parasites. His temperature had risen to 101·4° F. During the 16th he continued to have epileptiform fits, and in the 24 hours had some 12 in all. The clonic convulsions were general and did not appear to begin constantly in any particular part, but they were always associated with marked deviation of the head and eyes to the left. Between the fits he was either extremely drowsy or violently delirious. At 2 P.M. he received 0·8 gm. of quinine bihydrochloride intravenously, and at 6 P.M. 20 grains intramuscularly.

On the morning of the 17th his temperature was 101° and his pulse-rate 80 per minute. He was very drowsy and had passed no urine. He received 20 grains of quinine intramuscularly. At 9 P.M. he developed another fit, and it was noted that the left plantar reflex was extensor; the right plantar reflex was flexor. He was given 0·4 gm. of galyl intravenously, and a lumbar puncture was performed. The cerebro-spinal fluid appeared to be under increased pressure, and two test-tubefuls of clear fluid were drawn off. The cerebro-spinal fluid showed no increase in cellular elements. At 8 P.M., as he had passed no urine for 36 hours, a catheter was passed, and less than an ounce of urine was obtained; it did not contain any albumin, sugar, or casts.

On the morning of the 18th the temperature was normal, and the patient's general condition improved. He answered questions quite readily and was taking his nourishment well. The left plantar reflex was still extensor, and there were marked nystagmoid jerkings of the eyes on lateral movement to either side. The left leg was distinctly weaker than the right, but was capable of performing all movements with a fair amount of force, and there did not appear to be any ataxia of the limbs. Urine was being passed quite freely. He was given two doses of 20 grains of quinine intramuscularly on this date.

From this date onwards he was treated with quinine, at first intramuscularly, and later on by the mouth. Convalescence was uninterrupted. The weakness of the left leg rapidly improved, but the plantar reflex remained extensor for four weeks. The nystagmoid jerkings of the eyes varied somewhat from time to time, but were still definitely present six weeks after the patient's admission to hospital. When able to get up he showed a pronounced reeling gait and unless supported he tended to fall to the left. He stated that he felt as if his head were being pulled to the left. When made to walk holding his head down to his right shoulder with his right hand, the tendency to reel to the left was diminished, but was still present. There was no Rombergism and no ataxia. The optic discs were normal. He had no further fits after the 18th and was transferred to hospital ship in February, 1917.

CASE 6.—Dr. S., aged 22, was admitted to hospital on Sept. 29th, 1916. He reported sick on the 21st, complaining of pain in the head and back, and diarrhœa. On admission to hospital his general condition was fair, his temperature 103° F., his pulse 120 per minute, and his spleen two inches below the costal margin. He was put on 40 grains of quinine sulphate by the mouth per day. On Oct. 2nd, as the temperature was still raised, he was given 20 grains of quinine bihydrochloride intramuscularly in addition. On the 4th his temperature did not rise above 99°, and he appeared somewhat better. On the 5th the temperature again rose to 101·4°, and he complained of some pain in the neck and a little difficulty in swallowing. No definite affection of the cranial nerves could be made out, but the right plantar reflex was definitely extensor. He was again put on quinine intramuscularly. On the 6th the temperature again rose; he still complained of pain in the neck, and the right plantar reflex was still extensor. The respirations had increased in frequency, and there was some dullness at the base of the right lung posteriorly. He was given two doses of 0·8 gm. of quinine intravenously. On the 7th, as there was no improvement, he was given 0·4 gm. of galyl intravenously. He died on the morning of the 8th.

Post mortem the whole of the upper and lower lobes of the right lung were solid in a condition of grey hepatisation. There was a considerable accumulation of cerebro-spinal fluid below the tentorium and some œdema of the pia-arachnoid over the pons and medulla. The brain was hardened in formalin and then sectioned, but it did not show any macroscopic change.

Effects of Galyl Alone.

In these six cases galyl was used in association with large doses of quinine. So far we have been able to make only a limited number of observations of the effect of galyl alone on the subtertian parasites in the peripheral blood stream, but that galyl alone can cause the disappearance of the ring forms of parasite from the peripheral blood stream is shown by the two following cases.

CASE 7.—Sister S., aged 28, was admitted to hospital on Nov. 12th, 1916, with pyrexia. Numerous subtertian rings were present in the blood. The patient was put on 20 grains of quinine sulphate three times a day by the mouth. This produced constant vomiting, headache, and very troublesome tinnitus aurium. The parasites persisted in the blood stream and the pyrexia continued. On Nov. 14th she was put on intramuscular injections of quinine bihydrochloride, 20 grains twice a day. The intramuscular injections were continued for four days, but the patient was extremely intolerant of quinine, and complained of violent headache and tinnitus aurium with occasional vomiting. The temperature was swinging between 97° and 101° F. Subtertian rings were constantly present in considerable numbers in the blood. She was again put on quinine by the mouth, but on account of vomiting it was impossible to get her to take it regularly.

An intermittent pyrexia continued up to Nov. 27th, and during this period subtertian rings were constantly present in the blood. On Nov. 27th she received 0·2 gm. of galyl intravenously. Her general condition definitely improved, but the blood still showed subtertian rings, although in diminished numbers up to Dec. 6th, when she had a second dose of 0·4 gm. of galyl. From this date onwards there was a marked general improvement in her condition, although she still continued to show an irregular pyrexia, rising to 100° at night; her blood was examined every few days for malarial parasites until her discharge some two months later, but these were not again found. On Dec. 10th typhoid bacilli were isolated from the stools and on Jan. 2nd, 1917, she developed a periostitis of the right humerus.

CASE 8.—Private B., aged 26, elsewhere reported in detail, was admitted to hospital on the night of Oct. 4th, 1916. On Oct. 5th his temperature rose to 102° F., his general condition was poor, his sclerotics icteric, and he presented gangrene of the toes of both feet. A blood film showed the presence of rings and crescents, anisocytosis, poikilocytosis, and polychromatophilia. As it was considered possible that a vascular spasm aggravated by quinine might play a part in the condition of the feet, he was not put on quinine, but given 0·3 gm. of galyl intravenously. His temperature fell that night and remained subnormal throughout the rest of his stay in hospital. His general condition rapidly improved, and a blood film taken on the 10th was reported negative to malarial parasites. Two other blood films taken later were also reported negative. Before his discharge to hospital ship he was put on 10 grains of quinine sulphate twice a day by the mouth.

Persistence of Crescents under Combined Treatment.

In this case it will be noted that the crescents also disappeared rapidly from the blood, but in most of our cases of combined quinine and galyl treatment the crescents have been much more persistent, as in the following case.

CASE 9.—Private K., aged 23, was admitted to hospital on Dec. 23rd, 1916, with a diagnosis of bronchitis. The patient had been in hospital in May, 1916, with a diagnosis of P.U.O. and in October with malaria. He had not felt well since leaving hospital in October, and he stated that he had had frequent shivering fits since then. During September and October he had taken 30 grains quinine by the mouth per day, but had only been taking it irregularly in November and December.

On admission the patient's general condition was poor. His temperature was 102° F., and rose to 103° next day, to fall to normal on the 25th. His blood showed numerous subtertian crescents and rings. From Dec. 24th to 27th the number of crescents met with in counting 200 leucocytes was practically constant, the figures being 100 crescents to 200 leucocytes. On the 27th he was given 0·4 gm. of galyl intravenously. On the 29th the crescents had fallen to 50, on the 30th to 36 for every 200 leucocytes. On the 30th he again received 0·4 gm. of galyl. On Dec. 2nd the crescents had fallen to 24 in 200 leucocytes, on the 3rd to 14, and on the 4th to 7 crescents for every 200 leucocytes.

On the evening of Jan. 11th the patient developed catarrhal symptoms with a temperature of 101°, but without any rigor. A similar condition was at that time present in the ward, and was almost certainly not malarial. The temperature was normal on the 6th, and on the 6th and 7th the crescents numbered respectively 11 and 10 to 200 leucocytes. He received another 0·4 gm. of galyl on the 7th. On the 8th his temperature rose again and he had a malarial attack. Rings were found in the blood on the 9th. His temperature became normal again on the 11th and his blood showed no rings, but 25 crescents to 200 leucocytes. He was put on 40 grains of quinine bihydrochloride intramuscularly once a day, and 20 grains of quinine sulphate twice a day by the mouth. On the 13th, 14th, and 15th his blood showed 8, 7, and 8 crescents respectively to 200 leucocytes. On the 23rd and 24th 1 crescent to 200 leucocytes was found, and on the 25th and 26th no crescents could be found in counting 300 leucocytes.

On Feb. 1st 1 crescent was found in counting 200 leucocytes, on the 2nd, 3 crescents to 200 leucocytes. On the 4th and 6th no crescents were found in counting 400 and 300 leucocytes respectively. His general condition was now excellent and he was transferred to hospital ship on Feb. 7th.

Remarks

With regard to the value of combining galyl with quinine in serious cases of malaria our experience is yet too limited to permit of any dogmatic statements as to its efficacy. It will be noted that in the first six cases reported here all were seriously ill with definite subtertian cerebral malaria. All the cases recovered, with the exception of one who died of a complicating croupous pneumonia. All had received quinine, several of them large doses by the mouth, intramuscularly, and intravenously, without clinical improvement. In all of them, with the exception of the fatal case, the clinical improvement after the administration of galyl was striking and immediate. In none of the cases did the injection produce any unpleasant results, although several of the cases appeared almost moribund before the injection.

In Case 8, in which it was considered inadvisable to give quinine, galyl alone caused the disappearance of the parasite from the peripheral blood and produced a striking improvement in the condition of the patient.

In Case 7 the patient took quinine in any form with great difficulty, and although she had taken a considerable amount of quinine by the mouth and intramuscularly ring forms of the subtertian parasite were constantly present in the blood. After the first half dose of galyl there was a notable clinical improvement, but the parasite could still be demonstrated in the blood. After the second dose the parasites at once disappeared from the blood. The typhoid ran a protracted course, and she developed a periostitis of the left humerus, but in spite of repeated examinations parasites were not again demonstrated in the blood during the rest of her stay in hospital.

In Case 9 subtertian crescents were present in large numbers. Under treatment by galyl alone they diminished from 100 per 200 leucocytes to 7 or 8. The patient's general condition very greatly improved, but he still developed a malarial attack, with the presence of rings in the blood. These rings disappeared under treatment by intramuscular quinine and the crescents continued to diminish and were absent on Feb. 7th, when he was transferred to hospital ship.

We consider that we are justified in concluding: 1. That the treatment in itself is free from danger. 2. That in subtertian malaria which is resisting adequate quinine treatment, or where the condition is sufficiently alarming, the results of the combined galyl and quinine treatment have been encouraging enough to justify a further trial. It must be thoroughly understood, however, that the addition of galyl in no way diminishes the necessity for quinine. 3. That in cases where, on account of idiosyncrasy, quinine is impossible a valuable substitute may be found in galyl.

We take this opportunity of thanking Colonel Purves Stewart, C.B., A.M.S., consulting physician to the Salonika Force, for his valuable assistance and advice, which were always at our disposal. To Lieutenant-Colonel P. Mitchell, R.A.M.C. (T.F.), we are also indebted for permission to use the hospital records, and to Captain R. Richards, R.A.M.C. (T.F.), for the hæmatological and post-mortem reports.

SURGERY NEXT DOOR TO THE FRONT.

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IN his first Lettsomian lecture[1] Colonel Cuthbert Wallace sums up war surgery as being "in a great degree a matter of when and where to operate, and how best to move the wounded man to the place where he will win back to health."

The decision as to when and where to operate is not merely one of the operation, it is also a matter of how and where to nurse the patient afterwards. No nurse, male or female, can attend properly to a patient in a stretcher on the ground or at the most raised up on a trestle. The first of the above questions resolves itself into the fact that no operations should be done in any unit that has to remain mobile so long as the patient can be got back in a reasonable time to an immobile unit which has all the facilities of the modern operating theatre and of modern nursing.

The surgical work in a field ambulance therefore must be directed towards the second of Colonel Wallace's principles, "how best to move the wounded man." It is a matter of great importance that so high an authority should have publicly enunciated this as one of the two great principles of war surgery. There was a great tendency in the earlier days of the war for people to think that anyone with a knowledge of surgery was wasted when he was working in a field ambulance or as medical officer in charge of a battalion, and one was frequently told of some clever youth who had done nothing during many months of active service which could not have been done equally well by a well-trained orderly or a third-year medical student. It is the purpose of the first part of this paper to discuss from the surgical standpoint certain factors connected with the movement of patients which have come to the writer's notice.

Factors connected with the Movement of Patients.

We must first have some clear idea as to what we mean by the "reasonable time" within which we must get the patient back to the immobile unit—that is, to the casualty clearing station organised not on the lines laid down in the War Establishments and the Mobilisation Store Tables of 1914, but on the lines in which they may be seen in the stationary warfare of to-day.

It has long been recognised that for the successful treatment of an abdominal wound the number of hours which have elapsed between the time that the man was hit and the time at which he arrives at the operating unit is inversely proportional to his chances of recovery, and it has been the aim and object of all to get this class of case into the operating unit with the utmost rapidity.

But as the principles of wound treatment have developed it has become clear that the same rapidity should be aimed at in all cases. The latest notes on Carrel's treatment say "Treatment should be begun, if possible, within 12 hours of receipt of wound, and not later than 24 hours, if the maximum success is to be obtained." Our ideal should be, then, to get every case back to the C.C.S. at the quickest possible moment, in the same way as we now try to do with abdominal cases.

The actual number of hours is, however, not the only factor to be considered. Some cases are suffering so severely from shock that to get them down to the C.C.S. in the shortest possible time results in their arriving moribund, and it is necessary in some cases to delay the journey several hours or to use some means of transport other than the most rapid if it is likely to lead to less jolting on the journey.

[1] THE LANCET, 1917, i., 561.

Our subject then falls under two heads:—

1. Under *collection*[2] *and evacuation*[2] (*a*) to consider whether we can get every wounded man into the C.C.S. in the shortest possible time, which in one part of a line may be four hours or under and in another 12 hours or over. (*b*) If we cannot evacuate to the C.C.S. all cases within this time, to decide what steps can be taken to get down selected cases and what are the cases to which this preferential treatment should be given.

2. Under *prevention of shock and collapse* to consider what can be done (*a*) by the general principles known to civil surgery; (*b*) by the application or improvisation of special appliances for certain types of cases; (*c*) by the selection of means of transport in serious cases.

Any steps that we conclude shall be taken should be worked out during the relative quiet of trench warfare. We shall always be met by the criticism that you cannot do such things during an engagement. To this there are two replies. That you may be unable to do all, but that if you have practised them in trench warfare you will certainly be able to do some, whereas if you have never thought of them you will equally certainly do none. And that even if you could take none of these steps during an engagement you have still done a useful bit of work by applying them to the casualties of routine trench war.

Collection and Evacuation.

1 (*a*). The time that a patient takes to arrive at the C.C.S. is partly taken up by his being carried from one post or station to another and partly by the time which he remains at such a station or post. From the time that he is wounded to the time that he is ready to leave the regimental aid post (R.A.P.) he is in the charge of the regimental medical officer, and any speeding-up of the time during this stage must be the concern of the medical officer and his commanding officer. From the time that he is ready to leave the R.A.P. to the time when he is ready to leave the main dressing station (M.D.S.) he is under the charge of the officer commanding the field ambulance, and during the stage from the M.D.S. to the C.C.S. he is still under the officer commanding the field ambulance when the deputy director of medical services corps, has decided that this stage of evacuation should be done by field ambulance transport. This is usually the case in normal trench warfare where the field ambulance transport is not pressed to get its proper work done. This is to collect the cases from the advance dressing station (A.D.S.) to the M.D.S.

It is clear, then, that any speeding-up in the collection and evacuation of cases can either be done by the transport between these various points moving at a greater rate or by the time during which they are kept at the various points being shortened. Now the time that any form of transport takes to move over a given road, path, or track cannot vary much; and, as will be urged later, it is possible that such rapid movement does more harm by causing increased shock than it does good by getting the patient along more quickly.

If any time, then, is to be saved it must be done by shortening the periods during which the patient remains in the various stations. Part of this time is, of course, taken up in examining, dressing, and feeding the patient, but for the rest of it he remains in the ward resting till it is his turn to go on to the next stage. If transport could be ready so that every patient were sent on to the next station the moment he was dressed and fed, and the personnel at the next station could be informed of the exact time he was arriving, then every case would arrive at the C.C.S. in the minimal period of time.

This on the face of it is impossible, because it would mean that if cases came into the A.D.S. in a bunch every one would have to be dressed and fed simultaneously, whereas if they arrived one by one a fresh vehicle or other means of transport would have to be called out for every minor case with the result that a gross waste of transport would occur.

The matter is made more difficult by the facts that in many places collection from the A.D.S. to the M.D.S. can only occur by transport by night, that the distance is too great for hand carriage to be possible for every single case, that hand carriage even from the R.A.P. to the A.D.S. may be impossible by day. Further, it may be inadvisable to send cases on from the M.D.S. to C.C.S. at certain times of the day, either because it is too hot by daytime or because it is too cold by night.

We see, then, that our ideal that every wounded man should arrive at the C.C.S. in the minimal time is one to which we cannot attain, and all we can do is to make the average time for all wounded cases as short as possible by an efficient organisation and administration.

Selection of Cases.

1 (*b*). But if we cannot get every case down to the C.C.S. in the minimal time we can do much to get down within this time certain selected cases. Where early operation may save the man's life or limb we are warranted in taking greater risks. We should go over roads and paths under observation from the enemy by daylight. We must use transport for a single case more extravagantly than would be justified if it were not for its urgency.

What, then, are the cases for which these steps should be taken? That they should be taken for all cases where the abdominal cavity has been opened and the man is fit to move has long been recognised. With the development of "Carrel's method of disinfecting gunshot wounds" we should like to take these steps in every case of gunshot wound, however slight. In the smaller flesh wounds, however, we can hardly claim that the man's life and limb is so endangered by deferring the treatment for longer than 12 hours that we should risk other men's lives to get them down within that time. In wounds of the bones and joints, however, we can claim this. In all such cases steps should be taken to get them away from the line to the C.C.S. in the minimal time, even at great inconvenience to the organisation of the stations on the way and at considerable risk to the R.A.M.C. and A.S.C. men, whose duty it is to convey them. What are the steps which can be taken to secure this? These have already been indicated. That roads and paths under observation over which traffic is not normally allowed by day should be open to field ambulance transport for these selected cases, and that this transport should always be at the right spot at the right moment. Permission to use such roads and paths can be obtained from the general officer commanding the sector. The reason for not normally allowing traffic along such roads is not merely owing to the danger to the person passing along it; this, indeed, is often negligible. It is much more owing to the danger to the men who live near the road. Frequent movement along a road or path tends to draw fire not necessarily while the movement is going on. The person who bears the brunt is not the man living in the safety of the back area, who spends an hour or two once a week getting somewhere near the zone of fire, but the fellow who has to live in that zone of fire day and night, and is lucky to get into the safety of the back area once a month to get a bath. It is therefore most important when permission is given to take transport along such a road or path that this permission should not be abused, and that it should be used only for the purposes for which it was given.

To have the right transport ready at the right spot and at the right moment is no easy matter. Transport may be kept for weeks at one spot doing nothing and then be withdrawn for some other purpose, only to get a small run of cases at that very spot as soon as it is withdrawn. The most important thing is to have good communication between the M.D.S. and A.D.S., and again between this and the R.A.Ps. ahead. In this way the medical officer of the battalion can notify the officer in charge of the A.D.S. that a case is coming along, and if the necessary transport is not there it can be got up to the A.D.S. by the time the patient has arrived from the R.A.P. For this reason it would be well if every M.D.S. and A.D.S. were on the telephone.

But for getting patients down to the C.C.S. in the minimal time it is invaluable and should save many lives. An example of what can be done in this way may be given. A certain field ambulance collecting from a two-brigade front had an advanced dressing station at a cross-roads, up to which the cars went by night, but to which permission was given for them to go up by day for the purpose of evacuating abdominal cases only. It had been the custom for the case to be brought to the A.D.S. where the medical officer examined it. He then had to send a runner along the trenches

[2] These are technical terms. "Collection" includes the various stages between the place where the man was hit and the main dressing station of the field ambulance. "Evacuation" includes those stages from the main dressing station to the general hospital at the base of which the first only, to the C.C.S., is under discussion in this paper. *Vide* Field Service Regulations, vol. ii., and R.A.M.C. Training.

to the nearest signal office to send a message to the M.D.S. through the rear brigade headquarters. The brigade signal officer found a spare receiver and fitted it in to the A.D.S., and the code word "GUTS" was used and known at the six signal offices of the battalions in the line, at the two signal offices at advanced brigade headquarters, and at the two signal offices at rear brigade headquarters. When the battalion medical officer had a case of a wound in the abdomen he sent this code word both to the A.D.S. and to the rear brigade headquarters, from the latter of which it was sent by runner to the M.D.S. An ambulance car was then sent up at once to the A.D.S., where the medical officer in charge was ready expecting the case. He looked to see if the case were fit to be sent on and put it straight in the car, which took it at once to the C.C.S. In this way the minimal period was reduced from over six hours to four hours, and far more cases got down in the minimal time than had done so before because everyone was waiting expecting the case as it came along. This was done without any acceleration of the rate at which the patient travelled over any given part of the trenches or the road.

Prevention of Shock and Collapse.

2 (*a*) This resolves itself chiefly into getting the patients warm. All are agreed on this point. Before coming abroad the writer had thought he would do much with saline infusion, and brought on six sets of Lane's infusion bag apparatus. They have been of great use, but their scope has not been as great as he had hoped. There is always a doubt in an abdominal or chest case whether the bleeding has stopped, always a fear in a deep wound of the thigh that it may come on again before the case gets to the C.C.S. In some cases infusion is necessary, even though the bleeding may not have stopped, but in these intracellular infusion is of no use and intravenous is very hard under the circumstances. When it is done it must never be done instead of getting the patient warm, but only as an accessory to this. When the boots are taken off a man but slightly wounded it is most striking how cold the feet are even on a warm day. Hot-water bottles in large numbers are the great stand-by. This means hot water, and the field ambulance equipment would be very short of utensils in which to heat water if one stuck rigidly to the Mobilisation Store Table. It is the old question of mobility and transport, but everyone feels that a field cooker should be added to the field ambulance on a wheeled-transport establishment, and some Soyer's stoves are most valuable under any circumstances. Numerous blankets properly tucked in around the patient are the next factor, and this is followed by the hoods and stockings and socks that one can get from the Red Cross.

2 (*b*). On the above all are agreed, but what is less generally recognised is that the earlier a limb is immobilised the better will the case be in every way at all stages. Shock is enormously diminished by it, and the patient thus stands a better chance of his life. Short of this, he is more likely to get severe suppuration when the shock has been great. No case of a fracture of the long bone should pass the A.D.S. without being so treated. If it has not been done by the medical officer in charge of the battalion a case of fracture of the femur should here be put up in a Thomas's splint, a fracture of the leg in a back splint with foot-piece and two side splints, of the forearm in an internal angular, and of the humerus either by binding the arm to the side or by a Jones's arm splint.

But it is not only wounds involving the bone that should be put up in splints. All extensive wounds of the muscles of the limbs should also be so treated at the advanced dressing station and, above all, wounds involving the joints. It is not always possible, nay, it is generally impossible, to tell at this stage whether the joint is involved; therefore every wound which is near a joint should be treated as though it involved the joint. This is especially the case with the knee, where wounds which at first sight do not appear to be anywhere near the joint prove on arrival at the base to have involved it. A wound of the knee-joint travels best in a Thomas's splint, and such should be put on at the A.D.S. If a back splint is applied to any lower limb it must extend from the fold of the buttock to the tendo Achillis. Anything shorter than this is useless.

But it is not only by the more thorough application of splints that shock can be prevented. Every case of a wound involving the abdomen or chest should be conveyed in the semi-sitting position with the knees bent. A chair can be made attached to the two poles of a stretcher and the relief to the patient when he is put into this is so great that he will fall asleep without morphia, where beforehand he has been groaning with pain.

2 (*c*). The selection of the means of transport is often an important factor, and we must here go back to a point already raised—that the rapidity with which a patient arrives at the C.C.S. does not depend so much upon the rate at which he passes over the ground as the time he is kept waiting at the R.A.P. and dressing stations. On the other hand, upon the smoothness with which the transport moves depends very much the degree of shock to which the patient will be subjected. In other words, a motor ambulance car is not the best method of carrying a seriously wounded patient: it is the worst. The next in order of badness is the horse ambulance wagon. The best way to move a seriously wounded patient is on a litter or a travois. The writer prefers the litter because he has not yet seen any improvisation which enables a patient to be carried in the semi-recumbent position in a travois, and with a long distance—say ten miles—the work is more than a mule can do to drag the travois with patient all the way. For a short distance a long springy travois is possibly better for a case of fracture. The wheeled ambulance-stretcher carriages when drawn by an animal are also good, but a patient who has been in both prefers the litter.

In the writer's opinion one litter per section should be included in the establishment of a field ambulance with a wagon transport for the purpose of collection and evacuation of serious cases, and not limited to a field ambulance on a pack establishment merely for hill warfare. He firmly believes that the time which would be lost in conveying a seriously wounded case from an A.D.S. to a C.C.S. would be more than compensated for by the improved condition in which the patient would arrive.

Difficulties in Diagnosis and Treatment.

The writer would add a third difference between civil and war surgery to the two enunciated by Colonel Wallace—viz., that the patient is under the care of the corps and not under any individual R.A.M.C. officer. This depends upon the fact that cases are passed so quickly from one unit to another that they are never long under the medical care of one man until they arrive at the C.C.S., and usually until they arrive at the general hospital. The difficulty in making a diagnosis and in determining a line of treatment is increased, and there is a possibility that the line of treatment adopted by one medical officer may be changed by the next. Very likely the second treatment might have been the better had it been adopted from the first, but generally it is worse to change from one to another than to carry through to its conclusion an inferior line of treatment. It is well, therefore, to consider what steps may be taken to lessen this difficulty under which we work.

1. The most important thing is to standardise lines of treatment which have proved useful, and to insist that medical officers in the forward area should begin these and those on the lines of communication and at the base should carry them on when they have been begun. This may appear to interfere with the right of each medical officer to treat his patient in the way which he himself thinks best but is necessary under the circumstances. The principle has already been adopted in the routine administration of anti-tetanic serum, and might well be extended to definite rules as to the way in which certain cases of fracture should be splinted and classes of cases should be carried, kept, or hurried on to the next stage. It will then rest with each medical officer to decide in any individual case whether he should take the responsibility of diverging from the line of treatment laid down.

2. By instituting classes of instruction for medical officers from the base in the forward area where they could learn the difficulties under which the work is there done and at the base for medical officers in the forward area, so that they could appreciate the importance of beginning some approved line of treatment at the earliest possible moment. Schools of instruction have given excellent results in other branches of the service. Medical officers with the field units have not had opportunities of learning methods of treatment which have been developed since the beginning of the war except by utilising brief periods of leave at the base when they have

had there some friend who has been able to show them around. Medical officers at the base, especially the surgical specialists at the C.C.Ss. and hospitals, would get a wider view of war surgery if they had the chance of going around the forward area on one or two nights and learning the conditions under which cases are collected from the firing-line.

3. To consider as serious all cases which may possibly involve some important organ. An accurate diagnosis can seldom be made by a medical officer who only sees the case for a short period. Thus, many wounds of the buttock ultimately prove to have penetrated the pelvic cavity, and it is well to have a rule that every wound of the buttock other than a superficial through-and-through injury should be classed as an abdominal case; again, the early immobilisation of a wounded knee-joint is so important that every case with a wound anywhere near the joint should be put up in a Thomas's splint at the earliest possible moment. In each of these classes nine cases might be sent down with injuries that subsequently prove to be slight, but in the tenth the surgeon at the C.C.S. has been given a chance to save the life or limb which he could not otherwise have had.

4. Careful and accurate notes on the back of the Field Medical Card. There is often a tendency to remove a dressing at the A.D.S. which has been put on at the R.A.P. or to re-dress at the M.D.S. a case that has already been efficiently dealt with at the A.D.S. These repeated dressings lead to an increase of shock, and yet if there are no notes on the back of the card the medical officer at each stage is almost bound to look at the wound in order to decide what should be done. An entry by the medical officer who first sees the patient of the time at which the wound was received is a great help, as is also an entry of the pulse-rate at each stage of the journey.

5. To have some broad rules laid down as to the administration of morphia. This decision is a most difficult one. The medical officer at the R.A.P. is tempted to give a large dose because he feels that some heroic step must be taken to relieve the man of his pain over the next stage of his journey. The patient then arrives at the M.D.S. or C.C.S. in a delirious state, so that it is impossible to determine whether he is suffering from an excess of morphia or whether he is in a most critical condition as the result of his wound, and the decision as to the next step is a leap in the dark. Doses of half a grain nearly always lead to these difficulties. Instead of being comfortably under the drug the patient is restless and has lost all control over himself. Every attempt to examine him, to dress him, or to move him into a more comfortable position is frustrated by the man himself. It is said that smaller doses given at a R.A.P. have no effect in relieving a severely wounded man. Much can be done, however, by paying particular care to move him in the most comfortable position. If this is impossible it is better for the patient to undergo that pain until he arrives at the A.D.S., where he can be more efficiently splinted and where he can be put into a position which will automatically relieve him. In the writer's opinion it is unwise to give more than one-sixth of a grain, which can be repeated at the A.D.S. and M.D.S. if necessary.

Indications for Operation in Field Ambulance.

Should any operations at all be done in the field ambulance? It must be admitted that the indications are but few.

1. Abdominal cases which are too bad to be sent on to the C.C.S., but in which operation gives some slight hope of recovery. These cases are extremely rare. They are cases in which there is reason to believe that hæmorrhage is continuing, but if the man is too bad to be sent on he is almost certain to be too bad for an operation, and there is always the chance that the bleeding has stopped, when it would be better to leave the man for several hours and to send him gently on after he has picked up a bit.

2. Cases needing immediate amputation. These, again, are very rare and are practically limited to those in which the limb is hanging by a piece of skin or a tendon which merely has to be snipped through. Such can hardly be called an amputation, and if anything more is needed the man can either be sent on or is too bad for anything to be done.

3. Cases of bleeding from a single large vessel. These seldom find their way into the M.D.S., as they are dead before arrival. If a case is wounded close by a dressing station it may be possible for the medical officer to ligature the vessel with or without an anæsthetic being given.

4. Cases of bleeding from more than one small vessel in a large muscular wound. When a case arrives where the dressings have come through with the blood perhaps dripping on to the ground, where the pulse is rising, and the application of a fresh dressing does not promise to stop the bleeding, it is necessary to operate in order to pick up the bleeding points. In such a case probably the best thing to do is to excise the wound and to insert the tubes necessary for Carrel's treatment. The number of such cases is not great.

I have not yet seen a case of head injury in which an operation in a field ambulance came within the bounds of discussion. Supposing a field ambulance were in such a position that no cases could be got back to a C.C.S. within 36 hours, and this delay was due to the distance of the M.D.S. from the C.C.S. and not to the time spent in collection of wounded, the M.D.S. of the field ambulance would then take the place of the C.C.S. as the operating unit, and the indications for operation would be increased.

Illustrative Cases.

The following cases, which have passed through the field ambulance under the command of the writer during the last three months, illustrate most of the points which have been considered in this paper. In the area where we were working the A.D.S. was some 2000 to 3000 yards from that part of the line where most of the cases occurred. They were hand-carried back to the A.D.S. by trench or across country, but this could only be done in daylight for very exceptional cases. From the A.D.S. to the M.D.S. was 4000 yards, including an ascent of 200 feet and a descent of 500 feet. Over this stage cases were taken by litter or travois, but evacuation originally was only permitted by night. At a later stage the general officer commanding the brigade holding this part of the line gave permission for mules to be sent over the hill in daylight, and the following order was published: "The waiting litter may be sent down in daylight with any abdominal case, severe case of hæmorrhage, or of fracture of a long bone, especially of the femur, and such other case as the officer in charge of the A.D.S. thinks may urgently need immediate evacuation. Injuries of the head or chest should not normally be classed under this last head." From the M.D.S. to the C.C.S. was a journey of ten miles along a road, and all the serious cases were sent down, under the charge of a selected orderly, in litters as being less likely to shake the patient than an ambulance wagon. The rate of movement of the litter along the road is the same as that of an ambulance wagon. On one occasion, owing to a danger of the dressing station getting overfull, we wired for a motor ambulance, but found that the time taken up in getting the wire through and for the motor ambulance to arrive was so much that the patient would have arrived earlier at the C.C.S. had we ordered a litter from our own transport at the same time as we sent off the signal message. There was therefore no advantage in either form of ambulance wagon over the litter, and this certainly had the advantage over them of shaking the patient less.

Fractures of Long Bones.

CASE 1.—Sergeant —— sustained a gunshot wound thigh (left), with fracture of the femur, and arm (left) at 1.10 A.M. on May 30th. He arrived at the A.D.S. at about 3.30 A.M., where the large arm wound was dressed and the lower limb put up in a Thomas's splint by Captain Milton. From here he was sent on to the M.D.S. on a litter with the limb swinging from an iron bar and his body propped up with a back-rest fixed to the stretcher. He reached the M.D.S. at 7 A.M. and was sent on at once to the C.C.S., where he arrived at 11 A.M. He was therefore 9 hours 50 minutes on the journey including the time taken to dress him and to put on the splint. This was our record for rapid evacuation and was a most creditable performance for all persons concerned. It was not reached until we had been in this part of the line for two and a half months.

Unfortunately at the C.C.S. signs of gangrene appeared in the toe of the left lower limb and an amputation was necessary; a streptococcus was isolated from the lower limb and the *Bacillus perfringens* from the upper limb, and he died a short time after the amputation.

CASE 2.—Private —— is a more successful case of a fracture of the femur. He was wounded on the same piece of ground as the last case at 4 A.M. on May 17th. He was put up in a Thomas's splint by Captain Milton at the A.D.S. and went on to the C.C.S. with the greatest comfort. Here he was operated on and treated by Carrel's method and when seen by the writer at the base on May 30th was doing very well indeed.

Cases Illustrating the Question of Morphia Administration.

CASE 3.—Private —— received multiple gunshot wounds of both lower limbs, the left arm, face, and penis. Most of these were small in character. He was wounded at 2 A.M. on May 9th and reached the

M.D.S. at about 9 A.M. His lower limbs were first dressed by cleaning and shaving and application of gauze soaked in eusol, with back splints on each limb. At the same time the part of the head round the scalp wound was shaved and dressed. Attention was then paid to the left arm. Here there was an entirely different type of wound. The biceps was blown away with the brachial artery and median nerve completely divided. Two things were clear: that he could not be sent on without this vessel being secured and that he was not then in a fit state for an anæsthetic after the long dressing to which he had already been subjected. No note had been made on the Field Medical Card that the most important wound was on the arm. Had such a thing been done attention would have first been drawn to it, and the other wounds might have been left till later. At 5 P.M. an anæsthetic was given, and Captain Price Harris ligatured the brachial and redressed the arm. The man was sent on next morning, already toxic. He had his arm amputated at the C.C.S. on arrival, but died within the next 24 hours.

It is possible that this is the only case which has been through our hands in which an amputation should have been done in the M.D.S.; it is probable that short of this we should have done a complete excision of the wound, and not have been satisfied with mere ligature of the vessel. We might easily have sent him down the line earlier than we did. Every step that we took in this case was either wrong or done in a hesitating manner. The patient had been given ½ gr. of morphia soon after he was wounded, and we never knew whether his condition was due to the morphia or to his wound. Had we been on firmer ground we might have saved 24 invaluable hours and possibly his life. Indecision in such cases is bad surgery, but it is very hard to come to a decision under the circumstances.

CASE 4.—Private —— was a similar case. He was wounded in the abdomen at midnight on May 9/10th, and arrived at the M.D.S. at 7 A.M. He had had ½ gr. of morphia. He was restless and pale; but it was hard to say whether he was under the influence of morphia or suffering from hæmorrhage. An abdominal case was just leaving the M.D.S. for the C.C.S., so another litter was at once ordered, and he arrived at the C.C.S. alive at 11 A.M. with a slightly better pulse than when he had left the M.D.S., but died within about four hours. This patient would have probably died in any case, and he did not suffer from any indecision on our part; but we were quite in the dark over it, and when he left the M.D.S. I warned the orderly that he might die at any stage of the journey. It may be noted that the time from receipt of wound to arrival at the C.C.S. was 11 hours, which was the time taken with practically all the abdominal cases, when they were hurried through as quickly as possible.

Abdomino-thoracic Wounds of Left Hypochondrium.

CASE 5.—Private —— received a bullet wound in the left chest below and lateral to the apex of the heart and a wound of exit was found at the bottom of the back of the left chest. Through this protruded a piece of what was taken to be lung by the medical officer in charge of the battalion, but which was recognised as being spleen by Captain Milton at the A.D.S. Here he was put into a chair made by Corporal Radmore, R.A.M.C. (T.), for carrying a patient in the Fowler position. This is built on a pair of stretcher-poles, so that the body is inclined at an angle of 45° with the vertical and the hip- and knee-joints are bent at an angle of 90°. All our abdominal and thoracic cases have been carried in this during the last three months. Captain Milton reports that the change in the man when put into this was most marked; he stopped groaning at once and shortly fell into a comfortable sleep, so that the dose of morphia which Captain Milton had intended to give became unnecessary.

On arrival at the M.D.S. the patient was in a very bad condition. It was argued that if he were sent on to the C.C.S. he would die before arrival, if he were kept without anything being done he would as surely die, that his condition might be due to the fact that he was still bleeding internally, and that an operation might control this hæmorrhage and give him a chance of life. The abdomen was opened. The spleen was found divided in two with half sticking through the wound of exit. There was a large rent in the diaphragm, with the stomach and splenic flexure high up in the thorax, but bleeding had stopped and there was little or no blood in the cavities. The diaphragm was sutured, but he died while the abdomen was being sewn up.

The surprising thing in this case was that he stood so much before he died. Had we left him alone he might have stood a chance. The writer read Colonel Wallace's second Lettsomian lecture soon after operating on this case, and found that it came under two of the indications which he gives for leaving alone an abdominal wound—namely, when the patient is so ill that it is doubtful whether he will stand any operation, and in cases involving both thorax and abdomen in the left hypochondrium. The decision to operate was partly based on what was found in Case 6, while Case 7 illustrates what should have been done.

CASE 6.—Private —— was wounded at 10 P.M. on May 20th and died on the journey to the M.D.S. at about 4.15 A.M. on the 21st. There was a large wound through which pieces of the tenth and eleventh left ribs were sticking and a smaller one below the level of the twelfth left rib. Post mortem it was found that the small wound was the wound of entry, and from here one part of the missile had entered the abdomen near the left kidney, while the other had passed into the chest and out through the upper wound. There was a small injury to the lower margin of the left lung without any appreciable loss of blood into the left chest, but the left side of the diaphragm was pushed up to the level of the nipple with blood in the lesser sac. This was not investigated further owing to the difficulties under which the necropsy was done.

CASE 7.—Private —— was wounded at 11 P.M. on June 1st and arrived at the M.D.S. at 2.50 A.M., thought to be suffering from a wound of the abdomen from a missile which had entered the lower part of the left chest. His pulse was 150 and his general condition so bad that we did not even take him out of the Radmore chair in which he had been brought down from the A.D.S. He was raised up on a pair of high tressels and a heating stove put under him, with bivouac sheets hanging on either side to send the heat up. In this way we tried to imitate the electric heat-bath advocated by Colonel Wallace. He improved considerably, but unfortunately we overdid it slightly and he broke out into a sweat which reacted on the pulse. At 10 A.M. he was carefully lifted on to the operating table, the bandage was cut up, and the abdomen examined. No evidence could be found of any intra-abdominal injury except that on passing water the last ounce or so contained changed blood. There was dullness at the base of the left lung, and as we were examining him hyper-resonance made itself evident over the front of the chest and the heart began to become displaced. He was infused per rectum and left lying on the table till 3 P.M., when he was fit enough to be dressed. The chest was firmly strapped and the patient put back in the Radmore chair and given a small dose of morphia. Here he slept quietly for four hours, and in the cool of the evening was sent on in a litter to the C.C.S., where he arrived at about midnight. Next day he was doing well; the heart was then displaced over to the right side of the sternum.

In the writer's opinion these cases support Colonel Wallace's advice that abdomino-thoracic wounds of the left hypochondrium should be left alone. There is always the fear in the surgeon's mind that bleeding still continues and must be stopped at all costs, but it may have stopped of its own accord, and had Case 5 been treated in the same way as Case 7 I think the man's life might have been saved.

Sometimes the diagnosis of a superficial muscular wound of the pectoral region from an intra-thoracic injury is difficult in the early stages.

Case of Multiple Wounds Operated on at M.D.S.

CASE 8.—Gunner —— was wounded near the A.D.S. at 7.30 P.M. on May 31st. He had a large wound of the right upper arm and chest wall, which had taken away most of the muscles of the front of the arm and anterior axillary wall, another of the right forearm on the flexor surface which had left the deep fascia exposed over a circular area of four inches diameter, and a wound of the chin which had vertically split the lower lip and shattered the jaw. Captain Milton reports that he observed surgical emphysema in the chest wound and sent him down as an intrathoracic injury in the Radmore chair. On arrival at the M.D.S. at midnight his pulse was 104 and weak, his dressings had come through, but in consideration of the chest injury it was thought advisable to leave him alone. By 3.30 A.M. the pulse had risen to 120 and the bleeding was continuing. He was put on the table and the wounds examined. There was now no evidence of intra-thoracic injury, but it was clear that points must be picked up from among the muscles to stop the bleeding. It seemed well to do the whole operation. An anæsthetic was administered by Captain Rawson. The large arm chest wound was excised with most of the pectoralis major muscle and portions of the pectoralis minor, biceps, deltoid, and latissimus dorsi; the forearm wound was similarly treated and Carrel's tubes were inserted. Captain Petley then operated on the mouth in the same way and removed several pieces of bone, including the attachment of the genial muscles. His tongue then fell back and had to be held forward with a suture. On taking off his trousers to put on pyjamas a small piece of metal the size of a tin-tack was found sticking into the skin a quarter of an inch lateral to the right patella. This had probably entered the knee-joint, and it was clearly necessary to operate on it. His mouth condition prevented us sending him on, and it was clearly undesirable to give another anæsthetic within a couple of hours of the first. We therefore infused him per rectum, and after having dressed and breakfasted, lifted him on to a stretcher with a back-rest fixed on it. Captain Petley excised the skin and fascia with the piece of metal *in situ*. A hole one-eighth of an inch in diameter was seen in the synovial membrane. This was sewn up, and 5 c.c. of ether were injected from the mesial side. The limb was put up in a Thomas's splint, and the end slung to an iron bar fixed to the stretcher. By 5 P.M. he had sufficiently regained control over the muscles of his tongue for him to be sent on in safety. He was sent off at about 7 P.M., when it had become cool enough for travelling to be pleasant.

We have had the opportunity of following this case through the C.C.S. to the general hospital. He has, so far, had an uninterrupted recovery, secondary suture of the mouth wound was performed on June 12th, and on the 15th when we saw the dressings changed the arm wound was doing well and was much smaller than when originally seen. The knee-joint had never shown any signs of synovitis. This case exemplifies the importance of treating all cases wounded near a joint as though the joint was involved. The next teaches the same thing from the other point of view.

Case of Wound near Joint.—Buttock Wound.

CASE 9.—Lance-Corporal ——, orderly to the medical officer, was assisting the latter at about 2 P.M. on March 20th to dress a wounded man when another shell fell near them, wounding him in the right forearm with fracture of both bones and shattering his left lower limb. Owing to the question of observation he could not be got away till after dark and did not arrive at the M.D.S. till about 10 P.M. One of the wounds on the left lower limb was on the mesial aspect of the thigh 4 inches above the lower end of the femur. The wounds were dressed in the ordinary way and a back-splint put on. Doubts were entertained at the time as to whether this wound might have involved the joint, but he was not treated as though it had—that is, the limb was not put up in a Thomas's splint and the case was not sent on at once so as to ensure early operation, but was kept until 6 A.M. next morning and sent off then.

He was seen at the base on May 30th. He did not look as though he would recover. He had suffered for a long time from a raised temperature, associated with a suppurative arthritis of his knee-joint. A streptococcus had been isolated from the blood. Two days later the limb was amputated, and when seen on June 15th he looked distinctly better.

CASE 10.—Private —— exemplifies the advantage of looking upon all cases of buttock wounds as potential injuries of the abdominal cavity. He was wounded in the upper part of the left buttock at 1.30 A.M. on May 25th and was sent down in the Fowler position on the Radmore chair, arriving at the M.D.S. at 7.15 A.M. and the C.C.S. at 11.55 A.M., so that the whole journey was 10 hours and 25 minutes. He showed no signs of abdominal injury while in the field ambulance, but in the C.C.S. two holes in the gut were sewn up and a bleeding mesenteric vessel secured.

I have been able to follow through these cases by the kindness of Colonel T. Crisp English and Lieutenant-Colonel Kelly, who each gave up a day to taking me around the stationary and general hospitals of this force during a period of three days' leave at the base.

NOTE ON

THE GERMICIDAL POWER OF FLAVINE.

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THE following few experiments were undertaken in order to obtain data respecting the germicidal power of flavine. It will be remembered that Browning and his co-workers[1] claim that in flavine we possess a germicide which is very potent, and which is much more active in the presence of serum than in, say, peptone water. For the staphylococcus flavine is stated to be germicidal in 24–48 hours at 37° C. in a strength of 1 : 20,000 in peptone water, and in 1 : 200,000 in serum. Flavine is also stated to possess comparatively low inhibitory power on phagocytosis.

First of all some criticisms of Browning's technique and results may be made before detailing my own experiments.

1. In the tests made with staphylococcus and *B. coli* the organisms were cultured in peptone water (a poor culture medium) and a 1 : 20,000 dilution of the 24-hour culture was employed in the tests. A loopful of such a dilution yielded "20 or more colonies." In other words, a *very* small number of organisms is the subject of the test. In my opinion such a method of testing is fallacious and likely to suggest a germicidal power far above the actual one. In all disinfectant experiments a volume containing hundreds at least, if not some thousands, of organisms should be subcultured. The reason for this is that the destruction of bacteria by a germicide follows the course of a logarithmic curve, if the number of bacteria surviving at successive time intervals be plotted. That is to say, there is an enormous destruction of organisms at an early stage, but a small number survives for some time. If only a few organisms are subjected to experiment this factor may be entirely masked.

2. A great point is made of the increased germicidal power of flavine in serum, and apparently the inference is deduced that a similar potency will be exerted upon organisms in pus. But is such an inference legitimate? It is very questionable if serum and the purulent discharge of a wound are at all comparable. It is well known that serum is a poor culture medium for many organisms (Browning found that *B. coli* grows so poorly in serum that it was necessary to add peptone water to it in order to obtain a suitable culture!), while the purulent discharge of a wound may be swarming with organisms. In the only experiment with pus quoted flavine 1 : 2000 was required to sterilise it (a streptococcus + staphylococcus pus); a very different result from serum, in which 1 : 200,000 is stated to be efficient!

3. The germicidal action of flavine is so slowly exerted that Browning adopted not less than 24 hours' contact in his experiments. I question whether a germicide which is so slow in acting is going to supersede germicides which, even if less potent, are much quicker in acting.

4. A considerable point is made of the comparatively low toxicity of flavine for leucocytes in phagocytosis experiments. The method was to incubate the flavine + serum + leucocyte mixture for 20 minutes and to ascertain what strength flavine inhibited phagocytosis; it was found to be 1 : 500. Can any inference be deduced from such a test? Surely if the toxic action of flavine on bacteria is so slowly exerted that it requires 24 hours to be completed a similar time should be adopted, were it possible, for phagocytosis experiments, otherwise there is no comparison between the two, for the toxic action on leucocytes might be similarly slowly exerted.

I will now pass on to the experiments I have made to test the potency of flavine as a germicide and antiseptic.

1. *Inhibitory Power of Flavine on the Development of Organisms of the* B. perfringens *Group in Milk.*

A similar quantity of dust was placed into each of eight test-tubes. Recently boiled milk and flavine were added, the tubes were heated to 80° C. for 15 minutes, and incubated anaerobically for three days.

The following were the results:—

	Milk.	Flavine, 1 per cent.		Result.
1	9·0 c.c.	1·0 c.c.	= 1 : 1,000	–
2	9·5 c.c.	0·5 c.c.	= 1 : 2,000	–
3	9·75 c.c.	0·25 c.c.	= 1 : 4,000	–
4	9·9 c.c.	0·1 c.c.	= 1 : 10,000	+
		Flavine, 0·1 per cent.		
5	9·0 c.c.	1·0 c.c.	= 1 : 10,000	+
6	9·5 c.c.	0·5 c.c.	= 1 : 20,000	+
7	9·75 c.c.	0·25 c.c.	= 1 : 40,000	+
8	9·9 c.c.	0·1 c.c.	= 1 : 100,000	+

From this it will be seen that in a highly albuminous medium the inhibitory power of flavine upon the development of organisms of the *B. perfringens* group lies between 1 : 4000 and 1 : 10,000.

2. *Germicidal Power of Flavine upon the Staphylococcus in Broth.*

5 c.c. of broth were inoculated with 0·05 c.c. of a 24-hour broth culture of *Staphylococcus aureus* and flavine was added. The mixtures were incubated at 37° C. and 0·1 c.c. subcultured into broth after 9 hours and 24 hours. Result:—

	Flavine, 1 per cent.		Result after— 9 hours.	24 hours.
1	0·1 c.c.	= 1 : 5,000 approx.	–	–
2	0·05 c.c.	= 1 : 10,000 ,,	+	–
	Flavine, 1 : 1000.			
3	0·1 c.c.	= 1 : 50,000 ,,	+	+
4	0·05 c.c.	= 1 : 100,000 ,,	+	+

From this it is seen that the germicidal power of flavine on the staphylococcus lies between 1 : 5000 and 1 : 10,000 for a 9 hours' exposure, and 1 : 10,000 and 1 : 100,000 for a 24-hours' exposure. This experiment was repeated with an identical result. Under the conditions of experiment flavine is an active germicide, but the number of organisms acted upon, though much greater than employed by Browning, is not large.

3. *Germicidal Power of Flavine upon the Staphylococcus in Saline.*

An experiment similar to Experiment 2, but substituting saline for broth. The results were the same as in Experiment 2.

4. *Germicidal Power of Flavine upon the Staphylococcus in Saline.*

An experiment similar to Experiments 2 and 3, but using a larger number of staphylococci. A saline emulsion of an agar culture was made containing approximately 4000 million cocci per c.c.

Emulsion.	Saline.	Flavine, 1 per cent.		Result.
1 c.c.	0·5 c.c.	0·5 c.c.	= 1 : 400	–
1 c.c.	0·9 c.c.	0·1 c.c.	= 1 : 2,000	–
		Flavine, 0·1 per cent.		
1 c.c.		1·0 c.c.	= 1 : 2,000	–
1 c.c.	0·5 c.c.	0·5 c.c.	= 1 : 4,000	+
1 c.c.	0·9 c.c.	0·1 c.c.	= 1 : 20,000	+

Using a larger number of cocci, the result is that the germicidal power of flavine lies between 1 : 2000 and 1 : 4000—a considerable drop compared with the results of Experiments 2 and 3.

5. *Germicidal Power of Flavine upon the Staphylococcus in Human Serum.*

Strengths of flavine 1 : 100,000, 1 : 200,000, and 1 : 400,000 were first tested; none killed. Then the following mixtures were made and to each was added 0·05 c.c. of a broth culture of staphylococcus. Results:—

Serum.	Flavine, 1 : 2000.		Result.
4 c.c.	1·0 c.c.	= 1 : 10,000	–
4·25 c.c.	0·75 c.c.	= 1 : 15,000	–
4·5 c.c.	0·5 c.c.	= 1 : 20,000	+
4·8 c.c.	0·2 c.c.	= 1 : 50,000	+
4·9 c.c.	0·1 c.c.	= 1 : 100,000	+

The germicidal power of flavine in serum lies, therefore, between 1 : 15,000 and 1 : 20,000. This is a very different result from Browning's 1 : 200,000.

6. *Germicidal Power of Flavine upon the Staphylococcus in Pus.*

The pus was a pure staphylococcic one derived from an abscess in the neck. 1 c.c. of pus was mixed with 1 c.c. of

[1] Browning, Gulbransen, Kennaway, and Thornton, Brit. Med. Jour., 1917, vol. i., p. 73 (also ib., vol. ii., p. 70).

the flavine solution, and after incubation loopfuls were sown into broth and on to agar. Results:—

Flavine solution used.	Flavine strength in mixtures.	Result after incubation of subcultures. 24 hours. Broth.	24 hours. Agar.	48 hours. Broth.	48 hours. Agar.
1 : 100	1 : 200	— ...	—	— ...	A few cols.
1 : 500	1 : 1,000	+ ...	+	...	
1 : 1,000	1 : 2,000	+ ...	+	...	
1 : 10,000	1 : 20,000	+ ...	+	...	
1 : 100,000	1 : 200,000	+ ...	+	...	

Here even 1 : 200 flavine did not completely kill the staphylococcus in the pus, judged by the agar subculture (I believe that on the whole agar is a better culture medium than broth for disinfectant experiments); or if we take the broth subcultures, then the germicidal strength lies between 1 : 200 and 1 : 1000.

All the mixtures of flavine in the foregoing experiments were incubated for 24 hours before subculturing, unless otherwise stated.

Conclusion.

From the foregoing experiments the germicidal value of flavine comes out very much lower than that stated by Browning and his co-workers. The difference between the two sets of results is probably due to the use in my experiments of a number of organisms much larger than that employed by Browning and his co-workers. The result with pus is particularly poor and many disinfectants equal or surpass it and have the advantage of a much more rapid action.

Addendum.—The above note was written before the appearance of Mr. Alexander Fleming's paper in THE LANCET of Sept. 1st (p. 341) and no alteration has been made in it. It will be seen that both in our criticisms and in the results of our experiments there is a general agreement between Fleming and myself.

THE OPEN-FLAP METHOD OF TREATING PERFORATING BRAIN WOUNDS.

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EVER since the early days of the war, and more especially before the introduction of steel helmets greatly reduced their number, the problem of how best to handle perforating wounds of the brain has been of absorbing interest. The great question following the recovery of the patient from the initial shock resolves itself into our ability to assist nature in isolating the infected area during the period of repair.

Though much has already been written on this subject, I wish to present for consideration a simple method which, so far as I am aware, has not been used outside No. 1 Canadian General Hospital. It is one which in the hands of those of us here—Major Mackenzie Forbes, Major S. R. Harrison, Captain Johnson, and myself who have used it—has given most consistently gratifying results. It is based on sound elementary surgical principles—to wit, unobstructed drainage and minimum interference with the damaged parts, not only at the time of operation, but during the subsequent weeks of healing. Major Forbes, since returned to Canada, was the first to suggest two years ago the leaving down of the flap, but the technique as developed since has been radically changed and simplified.

Description of Method.

The first step in the operation consists in the turning down of a good-sized flap of scalp with perichondrium sufficient to expose freely the whole area of bone injury. This flap should, if possible, include the infected wound of entrance.

Next, the wound in the bone is enlarged, all depressed fragments being removed, and in addition a margin of healthy dura surrounding the damaged portion of the membrane is exposed. The wound in the dura and brain is disturbed as little as possible. Foreign bodies, metal or bone, are only to be sought for if shown, by localising X rays, to be quite superficial. The opening in the dura, if small, should, when the brain is much damaged, be freely enlarged by radiating incisions extending, if need be, to the limits of the bony opening, thus obviating any subsequent constriction of the neck of the hernia cerebri which develops.

The next step in the operation is most important. A strip of iodoform gauze is firmly inserted between the dura and the overhanging edges of the bony hole. The action of this is two-fold. It, in itself, primarily shuts off the general meningeal space from the infected wound, and subsequently stimulates the formation of the natural barrier of adhesions between the coats of the dura. A loose pad of fluffed iodoform gauze is then lightly packed over the whole denuded area.

The scalp flap may then be loosely replaced over the gauze, or it may, if considered desirable, be held down (or up) out of the way by one or two silkworm sutures. The outer dressings are of plain gauze moistened with saline or boric solution, and should be changed twice daily. The iodoform gauze must not, however, be disturbed for from five to seven days. At this date hernia cerebri will be found well developed, and not infrequently, enmeshed in the gauze, will be found small fragments of bone which at the time of operation were buried deeply in the soft substance of the brain, but which have, as Sir George Makins suggests, been extruded by intracerebral pressure along the path of least resistance.

Cerebral Herniæ.

Just a word here on the subject of cerebral herniæ. Opinion is divided as to the chief causes of their formation in these cases; some claim that it is entirely due to reactionary increase in the quantity of the cerebro-spinal fluid, and advocate lumbar puncture. Personally, I do not believe that this is the chief factor, and my experience of puncturing, done with the object of expediting recession of the hernia in two of the cases which I shall presently report, was not conducive to a repetition of this treatment. Moreover, it is practically not indicated when this technique is followed, since the intracerebral pressure does not unduly rise, if one may judge from the results of frequent fundus examinations. In no case was there more than 1 diopter of disc-swelling at any stage, and usually much less. Although having no microscopic proof, I incline to the view that the hernia in these cases is largely produced by an analogous process to that which occurs in other parts of the body during the healing of a wound—i.e., local increased vascularity, inflammatory œdema, and round-celled infiltration.

Whatever be the cause, the fact remains that we can confidently prognosticate the projection of a portion of brain through the wounded dura in the form of a more or less necrotic mass of varying dimensions, except in those cases which are previously overwhelmed by the gravity of their local lesions. What, then, happens to this tumour mass if, as was often the case, the flap be re-sutured at the time of operation, with or without the use of drainage-tubes? In a large number that I have seen—not, fortunately, in all—there was a latent period of from seven to ten days' hopeful convalescence, followed by a sudden rise of temperature and early death from general meningitis. The post-mortem findings in these cases showed, beside the picture of a spreading purulent meningitis beginning from the wound margins, that the soft necrotic brain matter composing the hernia had spread out beneath the skin-flap and, being an ideal medium, had through contact with the wound margins become virulently infected, with the result that the limiting adhesions formed by nature had not been sufficient to localise the infection.

The subsequent conduct of the case is simple. The deep dressing need only be changed bi-weekly. The hernia reaches its maximum size about the end of the second week and then begins slowly to recede, so that in from four to six weeks it no longer projects above the level of the bony parts, and the whole wound will be found to be covered with healthy granulation. The skin flap may now be safely replaced. Owing to its elastic retraction it may require a little patience to loosen thoroughly both it and the opposing skin margins to effect good apposition.

Results: Illustrative Cases.

I regret that I am unable to give full statistics covering the actual number of cases that have been treated by this method in our hospital—well over 50 to my personal knowledge—but the results, both as to life-saving and ultimate

restoration of function, have unquestionably proved far better by this than by any other method adopted here.

The following four cases will serve well, however, to demonstrate what may confidently be expected if this technique be followed. They are selected because of the fact that three of them, in addition to cranial wounds, were complicated by compound fractures of the frontal or fronto-ethmoidal sinuses, thus opening up an additional tract for infection, while the fourth case is that of a rare lesion of the base of the skull involving the cerebellum.

CASE 1.—Private E. F., aged 32, was admitted on Oct. 16th, 1916, having been wounded four days previously. Examination showed a large irregular oblique perforating wound of the right forehead, starting 1½ inches above the centre of the eyebrow, and running to almost the inner end of the same. The parts around were swollen, and soft brain matter was exuding from the wound. The right eye was proptosed, out and down, with very limited motion; vision was reduced to recognition of the figure at 4 feet. Nasal breathing was obstructed. The mentality was clear, but the patient was depressed and anxious; he complained of constant frontal headaches. X-ray—two directions—showed a large hole in the frontal bone with presence of large foreign body in post-nasal cavity, which was removed with difficulty, on account of its size, through the naso-pharynx and mouth. Operation next day. A frontal flap was turned down; the frontal bone was badly comminuted, involving, in addition, both plates of the frontal sinus. The roof and inner wall of orbit, with right ethmoid cells were disintegrated. The flap was replaced on Nov. 22nd, five weeks after primary operation, and the wound healed without suppuration.

The functional results in this case were particularly gratifying, both as regards sight and brain function, and for two weeks before discharge to England the man was able to do light hospital duty.

CASE 2.—Lance Corporal D., aged 20, was admitted on Sept. 19th, 1916. Examination showed a through-and-through wound of the head, entrance in front of the right ear, exit about the middle of the forehead, half an inch above the level of the eyebrow. The patient was rational, but very low-spirited—"wants to die." There was constant frontal headache, the right eye was destroyed, and soft brain was oozing from the frontal wound. X-ray of the head was negative for foreign body. In this case a single flap could not be used, so, after removing the eye, an incision similar to that used in the radical frontal sinus operation was made and the soft parts retracted.

In this case the large hernia had receded and the wound was closed six weeks after the primary operation. It is worthy of note, however, that it was found much more difficult to close than those cases where a good-sized single flap had been utilised. The functional recovery was complete except for the loss of his eye.

CASE 3.—Private W., aged 21, was admitted on Nov. 7th, 1916. Examination showed a small, perforating wound half an inch over the centre of the left eyebrow, with soft brain and fluid exuding. At the operation it was found that the wound in the frontal bone communicated with the frontal sinus, which contained a quantity of bloody offensive pus. A fissured fracture of the inner table of the frontal sinus extended down to the infundibulum. In this case, in order to determine whether lumbar puncture might hasten the recession of the hernia, on the fourteenth day after operation 15 c.c. of fluid were drawn off; no immediate result was observable, but on the next day there was marked reduction in the size of the hernia, and by the sixteenth day not only had it disappeared, but it had become a negative quantity, so that, in lieu of a tumour, there now presented a distinct cavity in the anterior lobe of the brain, the size of a pigeon's egg. The patient at this time complained of severe recrudescence of headache and his general disposition became markedly depressed. Nothing was done except to dress the cavity daily, and by the twenty-fourth day it had become almost occluded by approximation of its walls. On Dec. 7th, four weeks after operation, the flap was re-sutured. In spite of the fact that the bone over a considerable area beneath the flap appeared dry and dead-looking, primary union occurred.

CASE 4.—Private D., aged 24, was admitted on Nov. 15th, 1916. The patient had had an operation at a casualty clearing station, and the wound had been sutured. The diagnosis received was shell wound, cerebellum, right; fragment of shrapnel removed. Two days after admission he complained of increasing headache, and the wound broke down in the centre, discharging soft brain matter. In this case a posterior flap was turned backwards, and held in place by sutures. Hernia of the cerebellum, much disorganised, was found to be present beneath the skin flap. In this case, on the eighth day after operation, there was a thin fragment of bone extruded into the dressing an inch and a quarter long and a quarter of an inch wide. This patient also was subjected to lumbar puncture at the end of the second week, with similar results, though not so extreme, as in the last-quoted case. The hernia did not entirely disappear, but there was marked disturbance of the patient's *bien-être*, with recurrence of headache and leakage of serum, which I attributed to the traction on the protective barrier of dural adhesions around the bony opening. The flap was successfully closed at the end of the fifth week, at which time there were no functional evidences of cerebellar anomaly.

AMBULANCE TRAINING IN INDIA.—From a statement issued by the headquarters of the St. John Ambulance Association in Simla it appears that during the nine months ending June 30th, 1917, the St. John Ambulance Association in India and Burma instructed 11,955 persons in first aid to the injured, 787 in home nursing, 1216 in home hygiene, and 66 in sanitation. Of these 5962 have been awarded certificates, 165 vouchers, 55 medallions, and 27 labels for proficiency in first aid, 417 for proficiency in home nursing, 309 for proficiency in home hygiene, and 35 for proficiency in sanitation.

A NOTE ON MEDIASTINITIS AS A CAUSE OF HEART FAILURE.

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AFTER a massive gunshot wound of the neck, resulting in a gangrenous cavity which involves most of one or both anterior triangles, the possible causes of death are obvious; such are secondary hæmorrhage, septicæmia, or, if the air-passages are involved, septic pneumonia. In these cases it is not necessary to invoke a spreading infection in the cervical fascial planes to explain the result. In a second class of case a cellulitic spread of infection must be admitted, and is indeed apparent. I refer to small wounds which, communicating with the retropharyngeal space, initiate a retropharyngeal infection with or without a macroscopic abscess. In such an event a spread by the fascial planes is prevented and combated by surgical drainage. And drainage at this level, in the upper and mid-cervical region, is fairly easy. But it is otherwise lower down, as we approach the thorax. And there is another, third, class of case, much more distressing and difficult to deal with, to which this present note has reference.

A patient arrives with a truly insignificant wound anywhere about the neck—so insignificant that, at first glance, surgical intervention would hardly be considered. There are no signs, local or general, of inflammation. But, consistent with an increasing difficulty in swallowing or breathing or both, stereoscopic skiagraphy shows a foreign body, which, though quite small, is very deeply placed. The signs of pressure persist and increase, and so the foreign body is removed. In less than 48 hours the pulse and respiration rate have increased alarmingly, and in fits and starts. This, with an erratic temperature, is the only sign that things are going wrong. But adequate surgical drainage and cardiac stimulants are unavailing. And in a day or two, without having even looked ill or lost his colour, the patient dies.

The medical officer, before he sees the autopsy, would excusably explain such a clinical history by assigning the cause of death to (1) shock, (2) septicæmia, or (3) heart failure. Let us briefly consider these.

1. *Shock.*—Due to what? If to the injury, it may be asked why the patient was so well when first seen. If to the operation, it may be stated that this was neither extensive nor lengthy enough to cause shock, which, moreover, is hardly consistent with the fact that his tachycardia and rapid breathing alternated with periods of nearly normal pulse and respiration rate, that until the end his colour remained good, and that his temperature was irregular, not consistently low.

2. *Septicæmia?*—The patient may have died before there has been time to search for organisms in his blood, so this explanation is suppositious.

3. *Heart failure?*—That this has occurred is clinically obvious; but why should the heart have failed?

Of the following three cases the salient features are quoted, without details, to illustrate the onset of vagitis.

CASE 1.—Private, admitted August, 1916, with a small clean incised wound 1 inch long over the thyroid cartilage. Except for this the whole neck was, and remained until death, normal. Temperature was intermittent up to 101°·F., pulse up to 100. Respiration rate hovered around normal, but dyspnœa and hoarseness were constant and increasing. Lungs and heart were normal. Aided by skiagrams, a piece of shrapnel casing, 1 inch by ¼ inch, was easily removed from over the left lobe of the thyroid gland, just below the level of the cricoid cartilage, deep to the infrahyoid muscles, at about the point where the recurrent laryngeal nerve passes beneath the inferior constrictor muscle. The operation wound was dressed with very light packing of ribbon gauze and resulted in instant relief of symptoms. On the second day pulse and respiration rate rose so fitfully that it was difficult to chart. Cardiac stimulants proved useless; he died on the third day.

The operation wound down to the œsophagus was found to be quite clean. In the prevertebral space there was a layer of purulent lymph from the thyroid cartilage to vertebra D. 2 involving both vagi.

CASE 2.—Private B., admitted August, 1916. A shrapnel bullet which had entered behind the angle of the left mandible and traversed the mouth and palate was removed from the right antrum. The entrance wound, which was directed inwards to the prevertebral region, was kept dressed with saline; the patient's condition precluded any exploration under an anæsthetic. Temperature was intermittent up to 102° F. Pulse varied from 100 to 140. Respirations varied with startling suddenness from 20 to 60. From the second day until his death the left pupil was widely dilated to 12 mm. with no reaction to light. Lungs and heart were normal. He died on the fourth day.

There was a thin layer of purulent lymph in the prevertebral region of the left side from the pharynx to vertebra D. 3; this involved the left vagus and sympathetic. There was no macroscopic retropharyngeal abscess.

CASE 3.—Private P., admitted April, 1917, with a clean skin-wound ½ inch long in the mid-line of the thyro-hyoid space. There were no other signs of injury, and none of inflammation. Temperature was normal. He had increasing dysphagia and spasmodic dyspnœa. Stereoscopic skiagraphy showed a foreign body, hardly as large as the little finger-nail, just to the left of the mid-line, opposite vertebra C. 7 and 2 inches from the front surface of the neck.

Operation.—A probe would only pass along the track from the skin wound for 3 inches. Since, therefore, the foreign body could not be removed by this route, a formal dissection was made along the anterior edge of the sterno-mastoid tendon. It was now seen that the probe in the original track passed deep to the sterno-thyroid muscles, and there ceased abruptly. The sterno-thyroids and sterno-hyoids were then divided and reflected sufficiently to pass a finger down to the vertebra. Here a small piece of shrapnel was found lying in a pool of turbid grey fluid, which welled up as fast as swabbed away. Subsequent staining with osmic acid showed this fluid to be chyle. But in case the œsophagus were wounded as well as the thoracic duct, an œsophageal tube was passed. The operation wound was drained by tube. The operation, which lasted 20 minutes, was practically bloodless, and relieved all symptoms completely.

On the following day the patient gradually developed an irregular temperature, and spasmodic rapidity of pulse and respiration, just like the other two cases. On the third day these attacks merged into a chronic tachycardia (150) and rapidity of breathing (40), and the pupils became fixed (3 mm.). Heart and lung sounds were normal, but diminished. There was no hiccough or other diaphragmatic upset to suggest that the missile had injured the phrenic nerve. Cardiac stimulants and oxygen were unavailing. The wound remained quite clean, and the man's colour good, until he died on the fourth day.

After death the wound, from skin surface to prevertebral fascia, was found to be absolutely clean. But on stripping the œsophagus from the spine a layer of purulent lymph was found from the level of the carotid bifurcation to vertebra D. 2; this purulent lymph involved both vagi, of which the left was irregularly infiltrated and thickened to ¼ inch, for 6 inches of its length. There was no trace of the thoracic duct higher than vertebra D. 3, nor any wound of the œsophagus.

Commentary.—In Case 2 the foreign body passed through the retropharyngeal space. The patient therefore belongs to the second of the three classes of cases mentioned in the opening words of this note. And naturally the infection spread to the posterior mediastinum; his condition never allowed of operation, and he was doomed. This case is mentioned only on account of changes in the pupil of the affected side—which aided in the diagnosis.

The two other cases were more distressing, because they were on admission seemingly fairly healthy men, with trivial wounds. Despite operative and post-operative care, infection tracked extensively in the planes of the neck. In the light of such findings it is easy to understand why Crile recommended that for such operations as laryngectomy the cervical fascial planes should be opened up several days beforehand, and packed with gauze, so as to stimulate the formation of barriers of granulation tissue, defensive against infective spread.

Diagnosis.—The temperature is very irregular. It may rise to 104° F. and again fall; it may remain up or down for only an hour or for two days. There is no suggestion of periodicity in the pyrexia. The most characteristic feature is the sudden alternation of pulse- and respiration-rate. Thus, in Case 2 respirations in a moment changed from 20 to 60 and then after half an hour again back to 40. Following a deep wound, however small, anywhere in the neck, and although the prevertebral space may not have been obviously opened, this startling alternation (especially if accompanied by an altered size or mobility of one or both pupils, indicating involvement of the sympathetic) forms a symptom-complex. The diagnosis is vagitis due to mediastinitis. Such cases are, as stated above, often diagnosed simply as heart failure, shock, and so on.

Treatment.—The changes may be rung on cardiac stimulants with no success. Surgical cleansing of the wound, right down to the spine, is no safeguard. It would naturally seem that in the after-treatment of very deep wounds in the neighbourhood of the thoracic inlet posture is important. We should, as a matter of course, wish the patient to lie, if not on his face, at least semi-prone on the affected wide, with the head low. But with the acceleration of pulse and respiration orthopnœa is insistent, and it is not possible to keep the patient lying down. The anatomical difficulties of good surgical drainage at the thoracic inlet are great.

DONATIONS AND BEQUESTS.—The late Dr. John Henry Bartlet, of Birkfield, Ipswich, Suffolk, senior surgeon and honorary consulting physician to the East Suffolk and Ipswich Hospital, after making provision in his will for a number of legacies, including £100 to the Suffolk Convalescent Home, left the residue of his property, about £200,000, to the East Suffolk and Ipswich Hospital for a home of recovery for invalids.

Reviews and Notices of Books.

Les Fractures de la Mâchoire Inférieure. By L. IMBERT and P. REAL. With 97 figures and 5 plates. Paris: Masson et Cie. 1917. Pp. 151. Price 4 francs.

THIS manual is the combined work of L. Imbert, of the School of Medicine of Marseilles, and P. Réal, a well-known dental surgeon. This is an ideal combination of activity, for gunshot injuries of the jaw beyond ordinary surgical treatment require for the manufacture of proper splints the aid of those specially trained in dental surgery. The work of Claude Martin has had a profound influence on those treating this type of injury, with the result that the main object in treatment has been to restore the teeth to their normal occlusion, even at the risk of only obtaining fibrous union. Against this method the authors enter a strong protest and maintain that osseous union should be the goal, providing that in obtaining it the function of the teeth can be maintained. The authors advocate that in cases of non-union the edge of the fragments should be freshened and the parts fixed by metal plates. The results, they consider, are satisfactory. The reader turns with interest to the section on bone-grafting to see if the authors have been able to elaborate a method which will ensure success. The results recorded are not gratifying. There is a very full account of the various appliances used for immobilising the fractured jaw as well as a valuable note on the question of compensation for injuries of the jaw.

The authors take up a practical standpoint, and it is interesting to note that the views advocated are almost identical with those expressed by Mr. J. F. Colyer in his papers published in the *Journal of the Royal Army Medical Corps* for April, 1916, and the March and April issues this year of the *British Dental Journal*.

An Index of Symptoms, with Diagnostic Methods. By RALPH WINNINGTON LEFTWICH, M.D. Aberd. Sixth edition. London: Smith, Elder, and Co. 1917. Pp. 555. Price 10*s.* 6*d.* net.

IT is only two years since the last appearance of this compilation, but it is evident that Dr. Leftwich's ingenious industry is essential during war-time. Few new symptoms appear, but two minor additions have been made in the light of experience, although logically somewhat outside the scope of the book. One of these is a collection of brief descriptions of rare diseases to which attention is called in the lists of symptoms, but which the author fears his reader may search for in vain in current text-books. Such a fear we should hope to be ungrounded in the case of paratyphoid fever, tetany, and some others that might be enumerated. A list of eponymous signs now facilitates reference to further symptoms when the spoor of a disease has been a sign with an individual name attached—e.g., under Deafness, Nervous, the names are given of Bárány, Dundas Grant, Gardiner-Brown, Schwabach, and Weber. The book remains in its new edition a sound display of logical discrimination and of restraint in its application. It might fairly bear as a sub-title, "The Essentials of Diagnosis." In future editions the electro-cardiogram might suitably find a place alongside the sphygmogram.

The Practitioner's Medical Dictionary. By GEORGE M. GOULD, A.M., M.D. Third edition, revised and enlarged, by R. J. E. SCOTT, M.A., M.D. London: H. K. Lewis and Co. Pp. 962. Price 17*s.* net.

THE third edition of this dictionary contains, so the compilers estimate, 20,000 new words, and the addition has been made without detriment to the compactness of the volume by the use of thinner paper, slightly reducing the size of the type, and omitting unnecessary illustrations. The result fully justifies the labour expended on its production, the book as it now stands being complete, accurate, and up-to-date, as well as very pleasant to handle. During nine months' constant use we have failed to find any important omission. The dictionary is a little more inclusive than the title implies, as, in addition to derivations, formulæ are given and the dates of birth and death of those who have given their names to diseases or symptoms. The book may be recommended as a desk companion to all practitioners who wish to read intelligently and to write accurately.

Anæsthetics: A Practical Handbook. By J. BLOMFIELD, M.D. Cantab. Fourth edition. With numerous woodcuts. London: Baillière, Tindall, and Cox. 1917. Pp. viii. + 147. Price 4*s.* net.

Dr. Blomfield's book maintains its high character for usefulness. It is a model of condensed statement and intended, as it is, for beginners in the art of giving anæsthetics fulfils its aims admirably. The author considers it is best to omit detailed statements about the more intricate methods, such as intratracheal insufflation, intravenous and colonic etherisation, although he mentions the Dämmerschlaf scheme in parturition, spinal and parasacral anæsthesia. The chapter on these last methods, we venture to think, might with advantage be put a trifle more fully, and this suggestion applies with equal force to the sections on local and regional analgesia. Indeed, in these we find that Dr. Blomfield still recommends cocaine rather than the use of the novocain-suprarenin solutions now usually adopted. We may assume that anoci-association is not regarded by Dr. Blomfield as a student's method, and so is omitted. A useful, if brief, résumé of war methods is added in this edition and should prove valuable. The subject of anæsthetics has become so wide that any attempt to envisage it in a small compass presents great difficulties, while the decision as to what should be retained and what omitted is not an easy one; however, we feel that Dr. Blomfield has probably done the best possible. He writes with much lucidity and his teaching is sound and perspicuous. We note that by a slip Trendelenburg is wrongly spelt in several places.

LIBRARY TABLE.

1. *The Principles of Rational Education.* By CHARLES A. MERCIER, M.D. Lond., F.R.C.P. Lond., F.R.C.S. Eng., late Examiner in Psychology in the University of London. London: The Mental Culture Enterprise. Pp. 87. Price 2*s.* 9*d.* net.—2. *The Public School System in Relation to the Coming Conflict for National Supremacy.* By V. SEYMOUR BRYANT, M.A. With a Preface by Lord RAYLEIGH. 1917. London: Longmans, Green, and Co. Pp. 78. Price 1*s.* 6*d.* net.—1. Dr. Mercier's book is intended to bring home against the public schools and universities the charge that through their routine the originality has been crushed out of many of his friends, who have been turned loose in the world ignorant of that world, and unable to conduct an argument logically or to write intelligible English legibly. So much we learn from the prefatory words. He proceeds to deal with the standards and aims of education in a brilliant and summary manner, and covers in a few pages so much ground that he cannot expect any journal, with a definite scope like THE LANCET, to criticise his opinions in detail; but Dr. Mercier might not admit the justice of any criticism unless the authorities for it were set out with particularity, and this would be a very long task, and would also require a wide range of specialised knowledge. In some places to explain a disagreement from his conclusions or assumptions would entail—given the ability on the part of the disputant—the writing of a book larger than that in which Dr. Mercier aggregates his accusations against the training of our youth along literary or scientific ways. Dr. Mercier will not be able to convince his readers that he is always right, for, indeed, while he tells us much which thinking people believe, some of his diatribes are not made just by their wit. But at any rate he shakes us out of self-complacency and paves the way to reform.

2. Mr. Seymour Bryant's pamphlet might well be read at the same time as Dr. Mercier's essay. He deals with education in preparatory schools and the public school curriculum in considerable detail, showing the time employed in various subjects and the vagaries of the marks allotted to these subjects, making special reference to the evils of classical specialisation and to the failure at most schools to educate their youth either in science or modern languages. We take it that the book was largely written for the sake of the chapter in which the rôle of science in the educational scheme is fully set out, and the plea here is that classical specialisation should not hamper the study of natural philosophy. A final chapter on constructive policy has been dictated by the author's decision that the existing public school system cannot satisfy the needs of the day, and that the only remedy is to replace it by a new organisation. He outlines such an organisation, and, to some extent, his ideals of reform would meet Dr. Mercier's criticisms.

We recommend these two small books cordially to everybody, for they cannot fail to make us look closely at the methods under which our young men and maidens, especially youths of the upper and upper-middle classes, are educated. If, as a result, we find ourselves dissatisfied with the ideals, the practical aims, or the effective results of such education, we should be encouraged to help in altering the system.

The Medical Annual, 1917. Bristol: John Wright and Sons, Limited. Price 10*s.* net.—This useful "Annual" keeps up its usual standard in the volume for 1917, the thirty-fifth year of publication. In his brief preface the editor calls attention with justice to the fact that at the present time, when every department of medicine is understaffed, there is a remarkable indication of general energy and ability in the pursuit of the healing art. The "Annual" has been successful in putting the practitioner in touch with the main results of all this recent energy. Of the longer articles we should like to call special attention to those on gunshot wounds and wound infections by Deputy Surgeon-General A. G. Wildey; on war injuries of the jaws, by Mr. W. H. Dolamore; on poliomyelitis, by Dr. J. R. Hunt and Dr. F. Langmead; and soldier's heart, by Dr. Carey Coombs. The usual summaries of therapeutic progress, electro-therapeutics, and new inventions appear, and the care and precision with which the work is produced are evident on every page.

German East Africa. By ALBERT F. CALVERT, F.C.S. London: T. Werner Laurie, Limited. 1917. Pp. 122. Price 6*s.* net.—Mr. Calvert gives a succinct account of the early history of the German colony. The notorious Dr. Carl Peters was the pioneer of the German Colonial Empire in Africa. In 1885 he founded the German East Africa Company, endowed with treaties which he had obtained and which professed to give rights over some thousands of square miles. This was Germany's largest colony, larger than Germany itself, but with a population only of 7½ million natives and 5500 whites. Rubber, sisal-hemp, cotton, coffee, and capok are the chief products. Twenty years ago Dr. Hindorf imported a few sisal plants from Central America, but of 2000 plants only 72 could be kept alive, and yet to-day there are millions of plants cultivated. This was the most important product for export at the time of the outbreak of war. At the end of the book are collected 219 photographs and maps giving a lucid panorama of places and people.

JOURNALS.

Quarterly Journal of Experimental Physiology. Edited by E. A. SCHÄFER, W. D. HALLIBURTON, C. S. SHERRINGTON, E. H. STARLING, and A. D. WALLER. Vol. XI., No. 1. London: Charles Griffin and Co., Limited. 1917. Pp. 1–126. Price 7*s.* 6*d.*—The Influence of Corpus Luteum Extracts upon Plain Muscle, especially that of the Uterus, by M. Itagaki, with Appendix, by W. W. Taylor. That the corpus luteum is a gland of internal secretion was first suggested by Prenant, who, in 1898, arrived at his conclusions from the morphological character of the cells. The author's methods of preparing the extract and recording the movements of the uterus are described. The recording method used was a modification of the method devised by Magnus for the plain muscle of the alimentary canal. The uterus of the rat, cat, dog, and guinea-pig were used. The author finds that—

1. Extract of corpus luteum generally produces a distinct increase of tone in the surviving uterus of the rat, rabbit, cat, dog, or guinea-pig. Rarely, however, the opposite effect is produced. 2. This difference of effect is not due to the condition of pregnancy or non-pregnancy, nor to varying strengths of the extract, but apparently to a difference in different samples of corpus luteum having an antagonistic action upon the contractions of the uterus. 3. These principles can sometimes be separated by alcohol, the inhibitory material going into alcoholic solution. But this chalonic substance, which is soluble in water, is very small in amount. The hormonic substance, on the other hand, which is generally much larger in amount, is not soluble in alcohol nor in chloroform and ether, but is soluble in water. 4. If we compare the action of corpus luteum extract upon the uterus with its effect upon other forms of plain muscular tissue

we find that it generally produces relaxation of the muscular tissue of the intestine and of the bladder of the rat but contraction of the whole intestinal tube of the rabbit and kitten, although when isolated strips of either the longitudinal or circular intestinal muscle of these animals were taken they showed relaxation. Upon the iris of the frog no change could be observed. 5. Injection of corpus luteum extract into a vein produces but little effect upon the blood pressure; if anything, there is a slight fall. 6. A free secretion of milk is caused from the cut nipple of a lactating animal. 7. Urinary secretion is not appreciably affected. 8. The author was unable to obtain any definite proof that the action of corpus luteum upon the uterus is effected through the nerve-endings either of the sympathetic or of the pelvic nerve.

The appendix deals with the analysis of ash of corpus luteum of ox.—On the Action of Various Extracts obtained from the Cow's Ovaries upon the Muscular Tissue of the Uterus, Intestine, and Blood-vessels, by M. Itagaki. The author finds that—

1. Extract of hilum ovarii has the opposite effect to extract of corpus luteum upon the movements of rat's uterus, for it causes inhibition instead of contraction. The uterus of other animals is affected differently, for in the rabbit, cat, and guinea-pig an extract of hilum usually has the result of producing an increase of tone. 2. Liquor folliculi produces an increase of tone of the uterine muscle in the rat, rabbit, and cat, or at any rate an increase in height of the rhythmic contractions. 3. When applied to the whole intestinal tube all the extracts tested—hilum, liquor folliculi, and whole ovary—determine an increase of tone, whereas a strip of the longitudinal coat of the rabbit's intestine is sent into relaxation by extracts of hilum. 4. A fall of blood pressure is produced by intravenous injection of all the extracts employed—hilum, liquor folliculi, and whole ovary.

The Action of Certain Gland Extracts and Drugs upon the Uterus of the Rat, by M. Itagaki. The following results as summarised by the author were obtained:—

1. Extract of posterior lobe of pituitary always produces an increase of tone. 2. Solutions of adrenalin inhibit the rhythmic contractions (with or without diminution of tone). 3. Extract of thyroid occasionally produces an increase of tone, but generally has no effect. 4. Extracts of orchitic substance, of uterus, and of brain have no appreciable effect. 5. The action of nicotine is variable. Weak solutions produce an increase of tone, stronger solutions cause first inhibition, then increased contraction; still stronger solutions produce inhibition alone. 6. The action of pilocarpine is inconstant, but usually an increase of tone is produced. 7. Weak solutions of atropine produce increase of the rhythmic contractions. 8. Barium chloride in all strengths which produce any effect causes increased tone and stimulates the rhythmic contractions.

The Effect of Thyroid Feeding on the Weight of the Suprarenals and on their Adrenalin Content, by P. T. Hering. The administration of small quantities, 0·2 to 0·5 gm., of fresh ox thyroid daily to white rats increases the size and weight of the suprarenals both in young and adult animals. Reckoned in mg. per 100 gm. bodyweight, the extent of the increase in the 18 male animals examined averages a figure which is equivalent to a rise in weight of from 76 to 78 per cent. above the normal. This is the result of feeding the animals with the above-mentioned doses of thyroid for a period of from three to four weeks. Both cortex and medulla participate in the enlargement, but the hypertrophy of the cortex is somewhat greater than that of the medulla. There is reason to believe that where accessory suprarenals are present they too undergo enlargement. The adrenalin content of the suprarenals of the white rat increases, as a general rule, with increase in weight of the animal. The amount of adrenalin normally present is about 0·034 mg. per 100 gm. bodyweight. Feeding with thyroid increases the adrenalin content of the suprarenals. The average amount in the 18 animals examined averages from 0·049 to 0·052 mg., which is equivalent to a rise in weight of about 50 per cent. Owing to the relatively greater increase in weight of the suprarenals resulting from thyroid feeding the percentage amount of adrenalin in them is decreased, though only to a small extent. It is probable that the adrenalin in the accessory suprarenals, when these are present, is also increased. Rats fed with small doses of thyroid not infrequently die suddenly when apparently thriving. In the animals examined which have thus died there is great increase in the weight of the suprarenals and in the adrenalin content. The heart is greatly hypertrophied in addition. There is evidence that thyroid feeding results in rapid cardiac hypertrophy in white rats.—Carbohydrate Metabolism in Relation to the Thyroid Gland: II., The Effect of Thyroid Feeding on the Gaseous Metabolism, by W. Cramer and R. M'Call. The experimental observations were made on rats, which, being omnivorous, are specially suited for such observations. The present contribution is a sequel to previous studies on the same subject. Observations on the gaseous metabolism in experimental hyperthyroidism confirm the conclusion arrived at on other grounds, that the thyroid secretion produces an increased oxidation of carbohydrates. This effect is not due to a direct stimulating effect of the thyroid secretion on the oxidative processes in the cell, but follows upon its action in discharging glycogen from the liver. Two stages of experimental hyperthyroidism can be distinguished: an "early" stage in which the pre-existing carbohydrate of the food and of the deposits in the organism is oxidised. When all the glycogen has been removed from the liver a "later" stage sets in in which there is in addition a formation carbohydrate thus formed. The "later" stage is characterised by a marked rise in the CO_2 excretion and the O_2 absorption. The action of the thyroid secretion on the glycogenic function of the liver lies thus at the root of the increased oxidation of proteins, carbohydrates, and probably also of fats produced by thyroid feeding.—Experimental Observations on the Pituitary, by W. Blair Bell. This paper details the experiments on which Professor Blair Bell delivered a Hunterian lecture last year at the Royal College of Surgeons of England.[1] The conclusions come to are as follows:—

1. The pituitary body is an organ that is essential to life; its removal causes death within a few hours. In the cases which survive for longer periods the removal has probably not been complete. 2. The removal of very large portions of the pars anterior is incompatible with life. It appears certain from the evidence at our disposal that it is the loss of this portion of the organ that proves fatal when total extirpation of the pituitary is practised. 3. Partial removal of the pars anterior may, if sufficient quantity be removed, cause genital atrophy. This may occur in the absence of any other symptom, although the animal may remain undersized. 4. Neither partial nor complete removal of the pars posterior causes any symptom. The genital organs remain normal after operation, and young animals continue to develop. Hence the secretion of the pars nervosa is neither necessarily beneficial nor essential to life. 5. Partial removal of the partes anterior and posterior causes no symptom provided only a small portion of the pars anterior be removed. 6. Clamping and separation of the infundibular stalk, by interfering with the blood-supply and so causing degeneration in the cells of the pars anterior and intermedia, lead to the condition known as dystrophia adiposo-genitalis. 7. Artificial tumours in the neighbourhood of the sella turcica may produce irritation, which is accompanied by glycosuria and emaciation; or by interfering with the blood-supply may lead to degenerative changes in the cells of the pars anterior, and so give rise to the syndrome dystrophia adiposo-genitalis. 8. The pituitary body appears to be one organ, not two; and the essential and beneficial secretion is taken up by the blood stream, as in the case of the other organs of internal secretion.

Physiological Abstracts.—Issued by the Physiological Society and edited by Professor W. D. HALLIBURTON. Vol. II., No. 6. September, 1917. London: H. K. Lewis and Co. Annual subscription, 25*s.*—The standard of the Physiological Abstracts is well maintained in the September number of that publication, which contains more than 300 abstracts. The section devoted to plant physiology forms a considerable and apparently an increasing proportion of the total abstracts, and is particularly valuable to physiologists, who are liable to overlook work done in this field of research. There can be no doubt that, as time passes, the value of these abstracts is becoming more and more appreciated; they are especially useful at present when workers have so little leisure to devote to the reading of papers.

The British Journal of Surgery. Vol. IV. Bristol: John Wright and Sons, Limited. Price 30*s.* net.—The fourth volume of the *British Journal of Surgery*, under the direction of an editorial committee, of which Sir Berkeley Moynihan is chairman and Major E. W. Hey Groves secretary, maintains its high standard of excellence. Biographical notices with good portraits are given of Sir Charles Ball, Mr. Arthur Barker, and Sir Victor Horsley, as well as of two surgical worthies of an older generation, John Woodall and Peter Lowe. Sir Alfred Keogh contributes an introductory article on the surgical organisation of the war. Accounts are given of the surgical practice of other countries: American, by Dr. G. W.

[1] See THE LANCET, Feb. 19th, 1916, p. 420.

Crile; Portuguese, by Dr. A. H. Bizarro; French, by Professor Tuffier. The series of illustrations of war surgery by various writers, under the general editorship of Sir George Makins, is advanced another stage, and other groups of writers collaborate in large studies of tetanus and traumatic aneurysm. Individual articles under the signatures of well-known experts cover most of the range of war surgery. Reviews and notices of books occupy a score of pages. A noteworthy feature of the volume is the abundant illustration, some of it in colour, which reflects great credit on the publishers.

The Annals of Tropical Medicine and Parasitology. Vol. XI., No. 1.—The first contribution to this number of the *Annals* is by Dr. J. W. S. Macfie and Dr. A. Ingram, of the West African Medical Staff, the title being "Some Observations on Malaria in the Gold Coast Colony," where an unenviable reputation from the health point of view is disappearing under the considerable improvement in the health of its European officials. Malaria, mostly of the subtertian variety, is very common. The authors discuss the subject in its various aspects, including the relative frequency of the different malaria parasites, the seasonal incidence of the disease at Accra, the abnormal forms of parasites of the subtertian type, the association of malaria with œdema and the occurrence of anaplasma-like bodies in the blood of patients suffering from malaria. This paper is illustrated by two plates and some smaller illustrations in the text.—A second report on protozoal investigation of cases of dysentery, conducted at the Liverpool School of Tropical Medicine, is contributed by Mr. Henry F. Carter, F.E.S., Dr. Doris L. Mackinnon, Mr. J. R. Matthews, and Mr. A. Malins Smith, Lieutenant-Colonel J. W. W. Stephens, R.A.M.C., collaborating in the last part of the report relating to the treatment of histolytic infections. It appears that 20 men invalided from France were found to be carriers of *Entamœba histolytica;* 11 of these men had never been out of England before the war; one had been in Belgium, six had been in regions where amœbic dysentery is endemic, either during the war or earlier; in the two remaining instances details were not obtained. Four of the men had no history of dysentery and declared that they never had diarrhœa at any time; two who had no history of dysentery said that they had suffered from very bad diarrhœa in France for the first time in their lives; the other 14 all had a history of dysentery, 12 having contracted it in France. Two men had dysentery before going to France, and their attacks there were relapses; one of these had the disease first at Gallipoli, and the other in South Africa 12 years ago. It is cases such as these last two that are responsible for introducing amœbic dysentery into the trenches in France, although, no doubt, "non-dysenteric" carriers also play a part in the conveyance of the disease.—The Occurrence of *Ankylostoma ceylanicum* in West African Dogs is dealt with by Dr. Warrington Yorke and Dr. B. Blacklock, their paper being illustrated.—Dr. J. W. S. Macfie and Mr. Henry Carter supply a joint paper on the Occurrence of *Spirochæta eurygyrata* in Europeans in England, with a note on a second species of spirochæte from the human intestine.—The relapsing fever spirochætes are discussed by Dr. J. W. S. Macfie and Dr. Warrington Yorke, who from their investigations find that there is no appreciable difference in length between the spirochætes causing European (*S. recurrentis*), Indian (*S. carteri*), and African (*S. duttoni*) relapsing fever. The spirochætes, including double forms but not multiple individuals, range in length from 12 μ to 36 μ, but are most commonly about 17 μ to 20 μ long. These investigators were unable to discover any morphological distinctions between the spirochætes.—A preliminary note on persons, who have never been out of Great Britain, as carriers of *Entamœba histolytica* is contributed by Dr. Warrington Yorke, Mr. Henry Carter, Dr. Doris L. Mackinnon, Mr. J. R. Matthews, and Mr. A. Malins Smith, recording the results of the examination for intestinal protozoa of 344 persons, more than half of them being healthy young men who had recently entered the Army and were in training in a camp near Liverpool. Of these at least 10 (2·9 per cent.) harboured in their fæces cysts morphologically indistinguishable from those of *E. histolytica.* By feeding experiments on kittens the cysts in one of these cases were proved to be pathogenic.—A joint article, entitled "Studies in the Treatment of Malaria," is furnished by Lieutenant-Colonel J. W. W. Stephens, R.A.M.C., Dr. Warrington Yorke, Dr. B. Blacklock, Dr. J. W. S. Macfie, and Dr. C. Foster Cooper. This paper, which is illustrated by numerous charts, discusses the intravenous injections of tartar emetic in various forms of malaria, including double infections. The conclusion arrived at is that intravenous injections of tartar emetic do not cause the disappearance from the peripheral blood of any stage of malarial parasites, whether *P. vivax* or *P. falciparum*, nor do the injections control either the rigors or the fever of acute malaria. A second study in the treatment of malaria, by the same authors as in the previous contribution, deals with intramuscular injections of quinine bihydrochloride in simple tertian malaria. As diverse views had been expressed as to the value of such injections, the authors carried out a series of observations, and as a result found that an intramuscular injection of quinine bihydrochloride, 15 grains in 2 c.c. of water, on each of two consecutive days caused the cessation of febrile paroxysms of simple tertian malaria and effected the disappearance of all stages of the parasite from the cutaneous blood. The action, however, is only temporary, a relapse occurring within two or three days. The authors are careful to point out that this refers to simple tertian malaria only. They propose to deal with malignant tertian malaria in a future paper. As frontispiece to the number there is a very excellent photograph of Professor Mesnil, of Paris.

Parasitology, July, 1917, Vol. IX., No. 4.—The present issue of this journal contains an interesting paper by N. H. Swellengrebel on "*Blastocystis hominis*," in which the writer states his reasons for disagreement with both Prowazek and Wenyon as to the status of these bodies. He considers that it is highly probable that "*Blastocystis*" is not the name of a zoological genus but of a peculiar form of degeneration to which representatives of several different genera of the intestinal protozoa may be liable. In support of this contention he cites two cases, one that of a European who had resided for some years in the Dutch Indies and the other a Javanese temporarily resident in Europe, in whom he could definitely exclude both *Trichomonas* and *Chilomastix*. From the examinations of material in these cases he draws the conclusion that *Blastocystis* cannot, consequently, be a normal developmental form of either of these flagellates. Swellengrebel further states, in regard to other cases of *Blastocystis* infection which he had investigated, that "no blastocysts were found without an associated parasite." Regarding Alexeieff's *Blastocystis enterocola* he considers that it is different from the forms described in man under the same name, as in no case was sporulation observed. This paper is important as marking a distinct advance in our knowledge of these peculiar bodies.—T. Goodey and A. W. Wellings also contribute to this number an important paper on *Entamœba gingivalis*, in which they contest the view, advanced by Barrett and Smith, that this organism is the causative agent of pyorrhœa alveolaris. They consider that the organism, "so far from being a destroyer of healthy tissues in the mouth, is in reality a devourer of waste nuclear material derived from disintegrated salivary corpuscles together with bacteria, and is therefore most probably a useful scavenger." The writers state that they have found *Entamœba gingivalis* to be present in the majority of cases of pyorrhœa, but not in all. They also found it in most cases of gingivitis *not* associated with alveolar absorption. In smears made from the healthy mouth of a child 2 years old the organism was found to be present. Goodey and Wellings state as their general conclusions that "there is no evidence to prove that *E. gingivalis* is the cause of disease."—T. Goodey also contributes a paper on a new trichomonad flagellate, *Tetratrichomonas buccalis*, which he obtained in material removed from the lower incisors of one of the cases examined in connexion with the above paper. This flagellate possesses four anterior flagella and no free posterior flagellum. In stained specimens its length is from 7-12 μ. Both the above papers are supplied with excellent plates which illustrate the descriptions in the text.—H. Scott furnishes this number with notes on the *Nycteribiidæ* and descriptions of two new genera, and E. E. Atkin and A. Bacot a paper on the Relation between the Hatching of the Eggs and the Development of the Larvæ of *Stegomyia fasciata* and the Presence of Bacteria and Yeasts. Papers on Helminths are contributed by Sadao Yoshida, "Some Cestodes from Japanese Selachians," and K. I. Skrjabin, "Sur quelques Nématodes des Oiseaux de la Russie."

New Inventions.

A BATH FOR THE TREATMENT OF COMPOUND FRACTURES OF THE FEMUR.

THE difficulty of efficient bathing of septic compound fractures of the femur has been well manifested during the war. In the hope of overcoming this and of procuring more rapid aseptic conditions I have had made a bath which can be used with Hey Groves's or the Balkan splint, or with a slightly wider Thomas's splint and a cradle. The special features of this bath are as follows. It may be employed for (*a*) the ordinary saline or antiseptic bath; (*b*) continuous irrigation; (*c*) Bier's treatment after the bath; (*d*) it may be removed without pain or alteration of the position of the bones or interfering with the extension; (*e*) or it may be left on during the course of treatment when it acts as a special support and splint to fractured bone. The accompanying sketch shows the bath in use. The bath is made of strong rubber with pneumatic tube at either end, shaped to fit the limb. The pneumatic tubes or collars are inflated through a smaller tube provided with a tap; the upper of these

may be used by means of an adjusting strap as a Bier's ring. A tube conducts the solution from the bottom of the bath over the bedside for continuous irrigation; when an ordinary bath is required the tap provided is turned off. The firm portion of metal and rubber offers excellent support for the limb, and in use the bath is very comfortable. The malleable metal when covered with the bandage or towel and attached to the top of the splint, or cradle, resists the outward pressure of the pneumatic tube and so makes the bath water-tight. The removal of the bath is very simple, and performed without affecting the position of the limb.

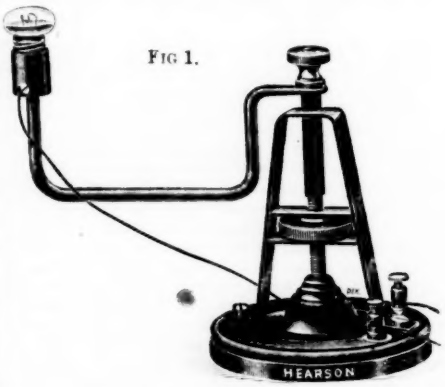
Messrs. Down Bros., Limited, St. Thomas's-street, Borough, S.E. 1, are the makers.

T. F. BROWN, D.S.O.,
Major, A.A.M.C.; Surgeon to Ararat Hospital, Victoria, Australia.

A SIMPLE LAMP FOR DARK-GROUND ILLUMINATION.

DARK-GROUND illumination is invaluable to the early diagnosis of syphilis, but would probably have been more universally used if it had not required a comparatively strong source of illumination. It can certainly be worked with such illuminants as an inverted mantle, but the light and bull's-eye have to be arranged very carefully, and the average microscopist, more interested in rapid diagnosis than triumphs in optical skill, has tended rather to neglect dark-ground illumination where he could not command such an illuminant as an arc or a Nernst lamp. To overcome this difficulty I was searching before the war commenced for a simple lamp which could be placed under the dark-ground condenser and illuminate it without the intervention of a mirror. At my request Mr. N. Clarke, of the Rochester Row Military Hospital, has worked out the mechanical details connected with the variable adjustment of the height of the lamp and the result is the arrangement illustrated. Although in its present form it will not demonstrate *Spirochæta pallida* satisfactorily with such paraboloidal condensers as the Zeiss, Reichert, Spencer lens, and Watson, it gives excellent results with dark-ground condensers of

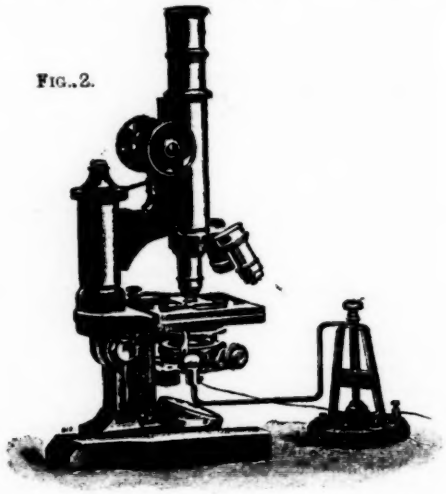
FIG 1.



the hemispherical type, such as the Leitz, Baker, and Swift. It is also a satisfactory illuminant for the examination of stained specimens.

As shown (Fig. 1), it consists of a small 4-volt bulb, which is mounted on a stand, so that it can be raised or lowered by means of a milled wheel. The lamp is run by a 4-volt accumulator or a dry cell, preferably the former. It is set under the condenser (shown in Fig. 2) and arranged so as to illuminate the centre of the field when the specimen is examined with a low objective. The high-powered objective is then turned on and the lamp raised or lowered by means of the milled wheel, so as to give the best illumination. It may also be necessary to adjust the height of the condenser,

FIG. 2.



lowering it very slightly to correct any haze. The field is usually quite black and shows up spirochætes easily; it is not so dazzling as with stronger sources of illumination, a point for which it may be preferred even by those who have electricity laid on and can use an arc lamp. It was designed, however, for use where stronger forms of illumination than gas-light are not available.

The lamp is made by Messrs. Hearson's, incubator makers, 68, Willow Walk, Bermondsey, S.E.

L. W. HARRISON,
Military Hospital, Rochester-row, S.W. Lieut.-Col., R.A.M.C.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 29, 1917.

First Aid in Air Raids.

THE dangers of air raids are known to all, and they are by no means small, even when no immediately fatal cases occur, but much of the risk is avoidable and is being avoided by the habit of taking immediate and adequate shelter. It is not courage but only foolhardiness to court disaster in the open during the brief duration of an air raid, and such conduct endangers the lives of others, for it enhances the peril to the police and to the medical men, who are thus impeded in their work. The dangers run by the whole community will be much lessened when every citizen makes a practice of taking as complete shelter as possible while the raid is progressing.

The roll of fatalities in raids on the metropolis is statistically negligible when the population of Greater London is remembered, but prompt first aid to the wounded is of prime importance. With a varying proportion of the injured the wounds will be of some severity, and, as recent records show, certain of these die not long after from the injuries they have received. Many of those with wounds which lead to a fatal result might be saved if the bystanders knew what to do. The authorities have arranged for medical and nursing aid to be brought soon to the injured, there is a corps of emergency surgeons who go on duty as soon as any notification of an air raid is received, and the hospitals are always ready to admit the wounded. Yet all these arrangements, careful and elaborate though they may be, cannot be available until many minutes have elapsed after the infliction of the injury, and there is little doubt that lives could be saved if those near the injured could help immediately the need arises. A knowledge of first aid is now, indeed, widespread, but anyone who sees how the members of the public deal with a street accident must recognise that any kind of useful first aid is generally absent. The knowledge acquired from classes on the subject is too often merely formal, and in the stress of an emergency yields to the aged and popular instinct to sit the sufferer up and give him brandy. There are three conditions which more than any others call for immediate treatment. One of these is hæmorrhage, and neglected it may rapidly prove fatal. If it is in a limb it is a very simple matter to tie a handkerchief round the limb nearer the body and twist it tightly, a short stick, if available, being used. A victim in last Monday's raid is said to have saved his own life by so doing. But simple as this course is, it is not usually taken, and we think that medical men should take every opportunity of telling all their patients that to die of bleeding or to let a neighbour die of bleeding may be an act of carelessness. If the bleeding is in the head or body this method cannot be used, and then the best treatment is firm digital pressure on the bleeding spot; but the uninitiated public cannot be expected to do good service in this way, save by giving every facility for the ministrations of more experienced persons. Another danger arises from fire. It is not at all rare in raids for the clothing to be set on fire, for some of the bombs are incendiary, and all should know that the speediest way to extinguish burning clothes is to wrap the sufferer in a coat, rug, or blanket, and so, by exclusion of the air, to put out the flames. Nothing could be simpler, and yet how seldom is this method employed. The third condition which calls for immediate treatment is impending asphyxiation. The fumes from the bombs may be the cause, or it may arise from the injuries received. Be the cause what it may, the treatment required is, first, the removal from the mouth of any obstruction to breathing, and then the performance of artificial respiration. Should no one present know how to carry this out, the simplest procedure is to dash cold water on to the patient's face, and this much knowledge should be in the possession of all; but we think the time has come when the heads of every household should understand the technique and rationale of artificial breathing.

Our readers, of course, do not need these elementary instructions. But when a little timely help is often of far greater value than aid which is delayed even for a quarter of an hour, we think that they might well impress upon the households which they visit, or their panel patients on suitable occasions, the value of acquiring such information. Everyone who can spare the time should learn first aid, and the aim of those who teach it should be not to endeavour to transform their pupils into surgeons by a few lectures and demonstrations, but to teach them to be ready to utilise those precious minutes which often elapse before a doctor can arrive on the scene. Self-possession and the application of the reasoning powers to the particular circumstances are essential to any knowledge of first aid; panic, whether violent or paralytic, is not only dangerous to the individual, but prevents him being of any service to his neighbours. Every thinking citizen will subject himself to a course of mental as well as of physical drill to fit him for whatever may turn up in these strenuous times.

Educational Hygiene.

IN an address delivered last week before a meeting of teachers at Sheffield the President of the Board of Education noted the rapidly expanding interest taken in educational problems in every part of the kingdom. The report, just appeared, of the Principal Medical Officer to the Board of Education is further evidence of this increasing interest. In 1915 the staff of the School Medical Service had increased in number to some 1300 medical officers, 103 of whom were women and 88 whole-time public

servants, while nearly 1500 school nurses were at work, two-thirds of them occupied during their whole time in the medical work of the schools. At a time when doctors have been drafted from every possible source to meet the urgent claims of military service it was inevitable that these numbers should be substantially reduced, but it has nevertheless been generally admitted that no considerable economy could be made in the administration of the school medical service without serious risk of impairing the health of the present school child, and in so doing the future health of the nation's workers. Recognising this by a stroke of genius the London County Council recently decided to reinstate its full staff of school doctors, so as to make it possible again to examine with care each entrant to school life. Sir GEORGE NEWMAN records that during the year 1915–16 some five-and-a-quarter million children were in average attendance at the public elementary schools of England and Wales, and that of this total nearly a million-and-a-half were medically inspected during the year ending Dec. 31st, 1916. Sad to say, the war was responsible for a decline of about 28 per cent. in the number of children examined last year.

Limitation of the medical staff proper has given occasion for an increasing coöperation among all agencies working for the physical betterment of school children. Sir GEORGE NEWMAN alludes to the opportunities constantly arising in the teachers' life for considering the welfare of the children under their care. Coöperation of teachers is at the present time a most important factor, and certain school medical officers have drawn up memoranda to assist head teachers in their districts in noting the indications for medical examination and treatment. A change has been gradually coming over the duties of the school attendance officer. The problem of school attendance has now become in the main a medical problem, other causes of truancy having practically vanished of recent years, and for the attendance officer there opens now the prospect of advising the mother of the school child on home treatment and the need for doctor or school clinic. Only a woman health officer is fitted to do this, and she should no longer be expected to act as police-court officer, nor should she bear the misleading appellation of sanitary inspector. The sphere of usefulness for such officers, increased as it has been by war conditions, is not likely to diminish with the cessation of these special conditions. In many districts voluntary children's care committees are in more or less active being, and it is in their effective work and coöperation with such agencies as the Invalid Children's Aid Association, the National Society for the Prevention of Cruelty to Children, the Children's Holiday Fund, and others that hope for the future lies. The coördination of all such organisations to form an unbroken chain of medical supervision lasting from birth to adolescence is the ideal. The neglect of systematic supervision has been largely responsible for the degree of physical disability to which medical recruiting boards have borne abundant testimony.

Mr. FISHER told us at Sheffield that one prominent lesson of the war is that the nation is rich enough and powerful enough to pay for anything that it really wants. Judged by this standard the keenness of desire for an efficient school medical service might well be greater than in the year under review. From 1913 to 1915 the yearly expenditure by local education authorities in respect of the work of the school medical service had increased from £286,000 to £411,000. In 1916 the increase was only 4 per cent. on the previous year, although in fairness it should be added that during this year expenditure on education of mothers and infant welfare has largely increased. The number of crêches set up by the Ministry of Munitions for the care of the children of married women employed in munition factories has now increased to 25, all of them drawing a grant of 75 per cent. for initial provision and equipment, as well as a maintenance grant of 7*d*. per head for each attendance, on the recommendation of the Board of Education. An encouraging section of the report deals with open-air education. The open-air school, Sir GEORGE NEWMAN writes, is a simple and economical way of applying a method of natural education to the susceptible body and mind of the children, and his remarks may be taken as a commentary on the proposal of the Education Bill, 1917, to found nursery schools. The number of dull or backward children incapacitated by physical infirmity from deriving reasonable benefit from their schooling is estimated at 10 per cent., or a total of some 600,000 children, and for these is contemplated a combination of life in the open air with simple methods of tuition which might well be applied in the long run to all the children of tender age in the country. The importance of the physical factors of ventilation, as distinct from mere chemical contamination of the air, long emphasised by Dr. LEONARD HILL, has almost become a medical commonplace, but it has by no means obtained a firm hold in the practice of the elementary school. Dr. HILL pleads with justice for ample open-air school accommodation, not only for the debilitated and unhealthy children but for the normal child as well. The gain will be seen not merely in the reduction in the cost of school buildings, a point doubtless appealing to local authorities, but in the reduced incidence of infectious disease and increased powers of resistance to them. Miss MARGARET MCMILLAN'S account[1] of her own adventure appears very opportunely. In 1916 only 15 open-air day schools were recognised by the regulations, affording accommodation for a mere handful of some 1000 scholars. A few local authorities have provided in addition residential open-air schools of recovery, but in these the accommodation does not amount to more than 400 or 500 places. Mr. FISHER'S proposal for nursery schools will, if carried into effect, result in a gradual transformation of the infant department of the elementary school into a real open-air nursery school, with an advantage to the youth of the nation which can hardly be exaggerated.

[1] The Camp School. London: George Allen and Unwin. Price 3*s*. 6*d*.

Annotations.

"Ne quid nimis."

ATROPINE IN THE DIAGNOSIS OF TYPHOID INFECTIONS.

WE have received an interesting report, published by the Medical Research Committee of the National Health Insurance, giving the results of Captain H. Fairley Marris's work on the effects of atropine upon the pulse-rate of patients suffering from infections by the typhoid group of organisms—viz., *Bacillus typhosus* and *Bacillus paratyphosus A* and *B*. A preliminary note has been published by Captain Marris,[1] and the present monograph gives a complete account of the test and of its results.

The origin of the observations upon which the test is based was an investigation by Captain Marris of the bradycardia so commonly present in patients suffering from infections of the typhoid group. In the course of this work he investigated the effect of atropine upon the slow pulse of these patients, giving a dose which in patients suffering from other conditions would cause a considerable increase in rate. He found that in those with typhoid or paratyphoid fevers the pulse failed to respond to atropine by any definite increase in rate. He also found that even with doses of 1/33 of a grain there were much less dryness of the mouth and dilatation of the pupil than would be produced in healthy persons by this dose. In using this test Captain Marris has concentrated his attention upon the pulse-rate, owing to the fact that it is capable of exact measurement and therefore offers a mathematical basis for his test. He satisfied himself after careful personal observations upon 200 suspected cases of these diseases that the atropine reaction could be employed for purposes of diagnosis, though unfortunately many of his records were destroyed in a fire occurring at the hospital in which they were carried out. The routine method he now employs is to apply the test with the patient in the horizontal position and at complete rest throughout, and he recommends that it should not be done until at least an hour after the last meal. The pulse is counted minute by minute till it is found to be steady, and usually ten minutes are recorded. A dose of 1/33 grain of atropine sulphate is injected hypodermically, as a rule over the region of the triceps muscle. After a period of 25 minutes the pulse is once more counted, minute by minute, until it is clear that any rise which may have resulted from the injection has begun to pass off, for which purpose 15 or 20 minutes may be necessary. The means of the readings before and of the readings at the maximum of the reaction after the atropine are compared, and if the difference between the two is 14 beats or less the test is regarded as positive and as indicating that the malady is one of the enteric group. If a positive reaction occurs within the first 14 days of the disease the diagnosis may be regarded as established, while if three negative reactions occur within the first fortnight the diagnosis of a typhoid or paratyphoid infection may be excluded with a considerable degree of certainty. Cases admitted after the fourteenth day often give positive reactions, but negative results after this period are often unreliable.

In appraising the value of his reaction Captain Marris is careful to point out that his observations have been made upon members of the Expeditionary Force in France—that is, upon patients under unusual environment, and with their conditions modified by inoculation. He indicates the need for investigation of this reaction in civilian patients before his results can be regarded as equally applicable to them. In a series of his own cases 104 positive results were obtained in 111 first tests, and the test gave a correct report in 94 per cent. of the cases. Captain Marris has investigated, as far as possible, certain other aspects of the atropine reaction in his research into its clinical value. In six carriers of these infections he found in every case a negative result with the atropine test. After inoculation with typhoid and paratyphoid vaccines in persons previously uninoculated, he obtained a positive result within two or three days, while previous to inoculation the reaction was negative. It would appear that the reaction is of short duration, though this point requires further investigation, owing to the small number of cases so far examined. Captain Marris gives certain reservations in regard to his test in addition to the one already referred to as to the value of negative reactions after the fourteenth day; thus he would be cautious in interpreting it in patients of 50 or over, especially in arterio-sclerotic subjects. Again, in patients with a pulse-rate of 100 or over the conclusion from the test must be made with some caution. If the response to atropine is negligible or the rate is lowered it may be regarded as positive; if, however, there is an increase of 8 or 10 beats per minute the test should be repeated. In very severe cases it would appear that a negative reaction may occur. Captain Marris concludes with some interesting suggestions as to the mechanism of the test, from which it would appear that he has supplied a convenient and easy test just when it was needed, as the problems of serological diagnosis have been complicated by protective inoculation. It is to be hoped that his interesting monograph will be widely read and that it will stimulate research into this reaction in civilian patients and possibly lead to the discovery of similar reactions in other diseases.

[1] Brit. Med. Jour., Nov. 25th, 1916.

SACRO-ILIAC STRAIN.

Professor William S. Baer has called attention in the Bulletin of the Johns Hopkins Hospital to a lesion which the general practitioner often sees but fails to recognise, because it has been described only in recent years, mainly by American orthopædic surgeons. Many have no doubt been wearied and even annoyed by patients who complain of pain—continuous and at times severe—in the small of the back or down the thigh. It is attributed to rheumatism, sciatica, lumbago, pelvic disease, and other causes, and may defy the efforts of the general practitioner and the gynæcologist. Many of these constant backaches—be they mild or severe, acute or chronic—are due to sprain or strain of the sacro-iliac joint. The term in use, sacro-iliac synchondrosis, is a misnomer. Recent investigations show that a true joint is present. The articulating surfaces of the sacrum and ilium are covered by cartilage, and this by a thin layer of synovial membrane. The motion allowed is small, owing to the configuration of the joint surfaces and the tightness of the ligaments. The amount varies under different conditions and is greatest at the time of parturition, when it plays an important rôle in the mechanism of labour. The strain on the joint is great, carrying as it does the trunk and upper limbs. When the angle at which the joint is placed and the weight carried are considered, it is not surprising that strain is common. This takes two forms, according as the sacrum swings backward or forward on the axis of its third segment. The former is the more important because of the severity of the symptoms. It may be due to difficult labour, direct injury such as a blow, or indirect injury in the form of severe muscular strain. The pain may be so slight as to be merely a lumbar or gluteal ache on one side, or so severe as to prevent walking and even lying down. The sciatic nerve passes down directly in front of the sacro-iliac joint, and according to the part pulled upon—sciatic, lesser sciatic, or

sacral nerves—the pain is referred along the corresponding branches. In most cases pain is produced on pressure over the joint. Professor Baer finds also that pain is invariably present over what he calls "the sacro-iliac point," a point "just to the side of and just below the umbilicus." This point is so often mistaken for McBurney's that many operations for appendicitis have been erroneously performed. Another sign is the flat back or obliteration of the lumbar curve, due to tilting of the upper part of the sacrum backwards. In unilateral cases there is generally deviation of the spine to the side opposite to the affected joint. Kernig's sign is positive on the affected side, owing to spasm of the hamstring muscles, and its elicitation produces pain in the joint. Treatment is simple and gives most satisfactory results. In acute but mild cases great relief is afforded by strongly compressing the buttocks and applying strips of plaster across them from trochanter to trochanter. In more chronic cases a belt encircling the pelvis must be worn. In women the corset may be used as a support for a webbing pelvic belt, or a pad which presses on the sacrum may be incorporated into the corset. In cases which resist these mild measures and in severe cases manipulation must be performed under anæsthesia. The fully extended lower limb is flexed on the abdomen, causing the contracted hamstrings to pull on the ischial tuberosity and drag the top of the ilium backward to meet the sacrum. This procedure is carried on until the hamstrings are thoroughly relaxed. It will now be found that the normal lumbar curve has reappeared. The position is maintained by a plaster splint extending from the nipple to the knee. After ten days this is removed and a pelvic belt substituted. Forward tilting of the sacrum is of different causation and occurs in girls who have outgrown their strength and in cases of visceroptosis. The back is hollow, and the main principle of treatment is to relieve the weakened abdominal muscles by a suitable corset. Massage and exercises should also be used.

A STATE-AIDED MIDWIFERY SERVICE IN ENGLAND AND WALES.

THE memorandum put forward by the Association for Promoting the Training and Supply of Midwives, which we briefly noticed in THE LANCET of Sept. 8th, continues to claim attention, and a correspondent comments on some of the main aspects of the problem of a State-aided midwifery service. The greatest need in maternity and infant welfare is to secure an efficient service in all parts of the country, so that the women in the poorest and often most congested districts shall not be left with inefficient attendance. At the present time it is left to chance or to private beneficence or to various associations to make the best of the existing deficiencies. A relatively small proportion of the women training as midwives ever practise, and the reason of this is that in present conditions it is very difficult to make an adequate livelihood, the fees they obtain from patients being too small. It is suggested that a proper fee for a midwife attending a confinement should be at least 20s. to 25s., according to the services rendered. The requisite sum required for providing these fees should be paid by the Exchequer and not be left to be provided by local rates. It is not considered desirable that attempts should be made to recover from the patient any charge for the services rendered under the new scheme, and in any event the fee of the midwife should not be dependent on the sum recovered from the patient. For such a scheme to be effective it is necessary that the money should be disbursed by the same body as is responsible for the inspection of midwives under the Midwives Act. It is suggested that the county borough council and the county council should administer these services, and the scheme must be conditional on great improvements being effected in the inspection of midwives in all parts of the country. It is further proposed that the guaranteed fee should be available also for any doctor who undertakes to give and does actually give the proper attendance and services at the confinement. In the event of midwives being compelled to summon a doctor to a case the fees should be payable out of the same fund. The whole scheme would entail an estimated expenditure of nearly £100,000 per annum. This sum would enable an efficient midwifery service to be given to every confinement in England and Wales in which the income is below the suggested £160 limit. The proposal that the conditions could be met by an increase in the amount of the maternity benefits or by the allowance of a cash payment to the mothers is not approved because this does not ensure the provision of efficient services. The scheme, as it runs, would, however, secure that the whole of the money allowed by the Exchequer is expended directly on the provision of services that immediately affect the welfare of the mother and her infant. No one will deny that adequate midwifery attendance is essential to the well-being of the community, and the fact that some 70–75 per cent. of all births are attended by midwives renders this matter one of national importance. At the present time there is still a large number of untrained midwives on the Register who were in practice before the passing of the Midwives Act, but it is disappointing to find how small a number of the women who qualify as midwives actually enter into practice. The reason is the very simple one already called attention to—viz., that an adequate living cannot be made in present conditions. The work is very arduous and badly paid. In these circumstances the proposals advocated by Dr. E. W. Hope in the above scheme have much to recommend them, and we are of opinion, if the poor throughout the country, and particularly in the poorer districts, are ever to secure a really reliable midwifery service, that some such State-aided scheme is a necessity.

LUMBAR PUNCTURE AS A CURE FOR CERTAIN FORMS OF IDIOPATHIC HEADACHE.

Dr. G. Mingazzini, professor of neurology in the University of Rome, has published 47 cases of persistent headache treated by lumbar puncture.[1] Before Quincke introduced his method of lumbar puncture cases had been recorded which showed that increase in the pressure of the cerebro-spinal fluid was the cause of inveterate headache, relief having followed an abundant discharge from the nose or ear, while Oppenheim noticed in a patient suffering from such attacks an optic neuritis with paracentral scotoma. It seems therefore probable that there are oscillations in the quantity of blood and cerebral blood pressure in relation with the functions of the brain. Physiologically such varia-

[1] Il Policlinico. Medical Section. July 1st, 1917.

tions are impeded by the hardness of the skull, and especially by the cerebro-spinal fluid, and there is therefore a reciprocity between the amount of blood and that of the fluid which causes variations of pressure in the latter. The favourable results obtained from lumbar puncture by Salmon in the treatment of intense headache accompanied by disturbance of vision induced Professor Mingazzini to apply this method to those forms of permanent headache which are so frequent, especially in young women.

The patients, six men and 41 women, were kept under observation for several months, some even for two or three years. They were all selected, uncomplicated cases, care being taken to eliminate any suspected of syphilis or tubercle, chronic nephritis, or intoxication by tobacco or alcohol, epilepsy or incipient tumour, a searching examination of the fundus oculi being insisted upon in every instance. The results of analysis of the fluid were invariably normal, all trace of globulin being absent, lymphocytes were either not present or did not exceed 2-3, while the albumin was in normal quantity as shown by Nissl's test. In almost all the patients there was a distinct increase of the headache after the puncture, sometimes lasting 8-10 days; rarely the pain disappeared immediately after puncture; while in one case only was there first a remission and then an exacerbation. The results of the puncture were not always the same: a definite cure was obtained in 24, about half the cases; a distinct improvement in 15, in whom the pain was so mitigated as to be more than bearable or returned after a long interval. In 8 cases no benefit was obtained. The result, favourable or otherwise, did not seem to depend on the age of the patient at the time; thus in one woman, aged 60 years, who had been subject from her youth to frequent attacks of headache, which for about six months had become of daily occurrence, a definite cure was obtained from a single puncture, while in another patient of 22 years, who had suffered for two years from headache after typhoid fever, no benefit resulted. In the unbenefited cases the pressure of the cerebro-spinal fluid was normal or low, whereas in those where there was improvement it was always high, indicating that increased pressure must be considered as one of the indubitable factors of the complaint. There seemed to be no connexion, however, between the quantity of fluid drawn off and the result obtained; in fact, in several patients who got no relief as much as 15 to 30 c.c. were drawn off, whereas in some who were relieved or cured 10 or even 5 c.c. were sufficient.

It might be thought that in cases where there was merely some improvement a complete cure would be obtained from a second puncture, but this only rarely happens, and some cases have derived no benefit even from repeated puncture. The reason for these different results is by no means clear, but, as a general rule, it may be stated that when the first attacks have begun early in life and the headache has become permanent later on without appreciable cause, the result of puncture has been a cure, or at least an improvement. No improvement, on the contrary, takes place in women in whom the headache had either been permanent from the beginning, or had commenced by attacks after the age of 20, and become permanent from debilitating causes, such as suckling or long illness, or else was associated with other neuroses, such as neuralgia of the fifth nerve, polio-encephalitis and epilepsy. Those cases which improved after puncture had generally suffered from permanent headache for a few months, whereas in patients in whom no benefit resulted the headache had been permanent for more than a year. Hence a permanent headache of long duration seems to be an element unfavourable for cure by puncture, but the changing of the headache from a paroxysmal to a permanent form, a commencement in the second decade of life without appreciable cause, and a duration of permanent headache for less than a year, represent elements favourable to the success of lumbar puncture.

THE BIOLOGICAL ASPECTS OF WARFARE.

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II. (*Concluded*).*

The Checks to the Operation of Might.

IT will be observed that the checks on the operation of egoistic might which we have already considered are purely intra-communal, their sole object being the integrity of the community. In the earlier phases of human society they took no part in regulating the relations between separate communities—between family and family or between tribe and tribe. The concern of each unit was its own welfare alone. It did not in the least trouble itself about the welfare of other communities. Consequently the principles which regulated the conduct of the members of any one community among themselves in no way governed their conduct towards other communities. The code of morality within the community did not obtain between individual communities. Rather was there a tendency for separate communities to regard one another with suspicion and animosity, so that incessant inter-tribal warfare may be said to have been the normal condition during the tribal phase of man's history. The more one tribe could injure its neighbours by murder, pillage, and the like, the more did it aggrandise itself, just as the status of the young brave was raised as the number of scalps he could display increased. In short, the sanction of conduct obtaining between separate communities was just that of might pure and simple. But with the further development of society—with the establishment of nations having commercial relations with one another—agreements of some sort had to be entered into between them, and these international obligations have become more and more binding as civilisation has advanced.

Now it might be thought that with the growth of commercialism, and the increasingly intimate social relations between separate states rendered possible by the ever-growing facilities of intercourse and transit, those checks to the operation of the might sanction which obtain within, and secure the cohesion of, individual states would in like manner gradually come to unite the nations of the world in one all-embracing commonwealth; and that just as within the properly ordered state conduct is guided and conflicting interests—personal, social, political, religious—reconciled, on lines of justice and common-sense, so also could, and should, international conduct be governed and international disputes be adjusted. But this devoutly-to-be-wished-for consummation is not yet. We have recently seen how a nation may in its dealings with other nations cast aside all moral restraints and revert to the same sanction of might as obtained between the most primitive human communities.

There could be no greater contrast than that between the ethical standard prevailing within a State and that obtaining between States at war with one another. In the one case the motto is, "Let justice be done though the heavens fall"; in the other justice is cast to the winds and the issues are to be decided by might alone. In the one case so high is the value set on life that every opportunity is afforded even to the most atrocious murderer to prove that he is innocent; in the other wholesale slaughter by the most terrible means which the mind of man can devise is sanctioned. In the one case the sanctity of private property and of compacts is rigorously upheld by all the might and majesty of the law; in the other compacts are dishonoured and property destroyed or confiscated to the value of untold millions on the sole ground of military necessity. All this is strangely primitive. When the citizens of a well-ordered State have a dispute over conflicting interests, private or social, they appeal to justice, and were anyone to suggest that the issue should be decided by personal combat his sanity would be suspected; but when a dispute arises between two nations and they fail to adjust it by argument it but rarely happens that they mutually agree—especially if the one be more powerful than the other—to submit to arbitration; they appeal instead—they revert—to the age-old sanction of might.

* Article I. and the first part of Article II. were published in THE LANCET of Sept. 15th (p. 433) and Sept. 22nd (p. 469) respectively.

The Influence of Warfare in Moulding the Individual.

In considering the effects of warfare on mankind we must distinguish between its educative effects, i.e., its influence in moulding the individual, and its racial effects, i.e., its influence in moulding the race. As regards the latter, I have already endeavoured to show that, while primitive inter-tribal warfare operated eugenically by favouring a survival of superior types, modern warfare operates dysgenically by promoting the survival of inferior types. But while modern warfare is thus *racially* harmful, *individually* warfare has always had some educational value, and it would be idle to shut our eyes to the fact. It is remarkable that among primitive communities those which cultivate warfare are generally superior to those leading peaceful lives. It may be argued that they become warlike because they are superior rather than the reverse. Facts, however, tend to show that whether a community is warlike or peaceful depends mainly upon the conditions under which it lives; thus the nomadic career of the hunter and herdsman is favourable to the warlike spirit, while the life of "stationary" (as distinguished from "migratory") agriculture tends to be peaceful.

There can be no doubt that military training has a beneficial influence, physical and mental, in moulding the individual. Its good effect physically is shown in the rapid improvement in the physique of recruits after enlistment. (At the outbreak of the present war there were far too many contracted chests and round shoulders in this country.) Its value in the moulding of character is no less decided; above all, it teaches discipline and respect for authority, both of which are in danger of neglect in democratic communities. It would be difficult to exaggerate the importance of discipline: it is a prime essential to good citizenship, and it is as needful to the one sex as the other. Every boy and every girl should from an early age come under its rigorous influence and be made to realise not only that it is an essential to right living, but also to individual happiness and success in life; and there is nothing better calculated to inculcate discipline than military training. This, or something equivalent to it, should begin in early school life.

So much for the good that can be got from training for war. What about war itself? While realising that man has evolved through slaughter, and that every step in his long upward path has been stained with blood, I must confess that modern warfare seems to me as inane as it is horrible. This wholesale slaughter and mutilation of one set of men by another set of men who have no personal quarrel with one another, who are not even personally known to one another, and who under different circumstances might have been knit together in closest fellowship, has for me no bright side. This driving of thousands upon thousands of a nation's picked manhood to the shambles, this wanton carnage, to say nothing of the loss of productive energy and the colossal destruction of wealth, is, one feels instinctively, wrong; the horror is only equalled by the inanity of it.

But though actual war is detestable, yet it must be confessed that indirectly it serves a useful purpose in that the fear of it leads a nation to exercise itself in the virile pursuit of arms and to hold itself in readiness to meet an enemy, while actual war rouses the community to put forth supreme efforts; and this striving to overcome a threatened or actual danger works beneficially and leads to the development of latent possibilities in a manner undreamt of in the easy-going times of peace.

Nothing but the call of actual war could have aroused our country to accomplish what it has accomplished since the July of 1914. What other impelling force could have induced us to increase our national expenditure tenfold, to liberate vast stores of unused energy, to transform the whole economic life of the people, to sacrifice by tens of thousands the flower of our manhood, as has been done since the declaration of the war? All which goes to show how great things a nation can accomplish once the necessary stimulus is forthcoming. If only some equally effective stimulus could be found in times of peace, one which should impel to similar energetic action, not for the purpose of slaughter and destruction, but for the common good! What might not be accomplished if all the energy and ingenuity and self-sacrifice which we have devoted to the prosecution of this war had been directed to the clearing out of the slums of our cities and to the providing for the toiling millions healthy, well-appointed, and beautiful homes. Our present experience should serve to bring forcibly before us the fact that we have it in our power to do all this and much more. All that is needed is the proper organisation and distribution of our activities—*and the adequate stimulus.* But how to get the stimulus is the difficulty. I fear that nothing but a great external danger such as we are now facing is capable of supplying it. Theoretically a great religious revival might suffice, but it would have to be one which concerned itself not so much with the attainment of a possible heaven in another world as with the removal of some of the evils suggestive of another place in this one.

Strange as it may seem, and contrary as it may be to our predilections and *a priori* conceptions, the condition of peaceful ease in which we picture the lion lying down with the lamb is, from nature's point of view, far from the ideal. A community long lulled in a state of blissful ease is bound to deteriorate, for all healthful life implies struggle. Man needs to be roused from the apathy into which he so easily slips by difficulties to overcome, and there is no more arousing stimulus than the apprehension of danger.

Few will deny that when the present world-war burst upon us we had as a nation grown lax and inert through long years of ease and luxury, and that whatever may be said of the ultimate effect of the war on the other belligerents, the people of these islands and of the British Empire as a whole will be greatly benefited by it. For not only has it tightened the bonds which unite the units of the Empire, but it has awakened undreamt-of stores of dormant activity, and I go as far as to believe that the greater the difficulties we may still have to contend with—the tighter the corner in which we may find ourselves, the more we may be compelled to fight with our backs to the wall—the better will it be for us individually and for the Empire at large; for it is only through struggle, fierce and sustained, that an individual or a nation can realise itself to the full. Struggle has been a necessary factor in evolution. It is the normal condition of every living thing, save those degraded parasites which inhabit the interior of their host and pay the penalty of their parasitism by a corresponding degradation in structure and function; for it is a primal law of nature that once the need for struggle is removed degeneration sets in. Hence one of the great social problems confronting man in the future will be how, without having recourse to war with all its horrors, to counteract the enervating and degenerating effects of the ease and luxury which tend to be shared by a considerable section of every prosperous community. In the perfect State the conditions would be such as to render such enervation impossible. Every able-bodied person would be compelled to pull his full weight in the ship of State—to play his part in that healthful struggle which is essential to adequate development. Pure parasitism, which prevails all too widely among us, would be debarred save in the case of the diseased and decrepid. To sanction it is unjust to the individual, though he may not know it, and unjust to the State. (In insisting upon struggle as essential to development, individual and national, I do not, of course, mean that it should be so severe as to be paralysing. No one would contend, e.g., that conditions of abject poverty can have any other than evil results.)

If I am asked how a nation, once peace and prosperity are secured to it, is to be kept engaged in bracing struggle and prevented from lapsing into enervating ease, I reply that I have no panacea. This desirable end can only come through enlightenment. But while so many evils to be set right still remain within the body-politic, while so many social questions of the gravest urgency press increasingly upon us, while all Europe has to be rebuilded and its new world relations to be readjusted, it is safe to say that it will be long years before we shall be in any danger of relapsing into dreamful ease and before that time comes the enlightenment may have come also. Moreover,

> ..... Man is not man as yet.
> When all mankind alike is perfected,
> Equal in full-blown powers—then, not till then,
> ..... begins man's general infancy.

Means of Preventing Warfare.

Whether the nations of the world will ever attain to sufficient wisdom to abandon warfare I forbear to prophesy. One cannot but hope that with advancing knowledge and clearer vision war will tend to die out, and that just as we in this country, after centuries of internecine fighting, were finally welded into a united people, so all the nations of the

earth will some day be united into one great commonwealth. We are living in great times. Vast regions of the world are being opened up and developed with stupendous zeal; the exuberant output of inventions, such as the telephone, the automobile, the flying machine, and labour-saving machinery of all kinds, is profoundly modifying the conditions of life; intercourse between nations is becoming more and more intimate, added to which men are gaining an ever deeper insight into the laws of life; the elemental facts of evolution, of heredity, and of social science are beginning to make serious appeal to men's minds, and must before long be accepted as axiomatic truths pregnant with meaning as regards human welfare. The time is not far distant when children will be taught these truths as they were once taught their catechism, so that they will become part and parcel of the common mental equipment, and when this stage of general enlightenment is reached nations, it may be hoped, will find other ways of settling their disputes than by an appeal to the barbaric sanction of might.

When the unhappy Malvolio complained of the darkness of his cell, the fool's taunt was, "There is no darkness but ignorance." It was Malvolio's entire ignorance of the true situation which led him to think that his mistress had lost her heart to him, and in like manner it was the darkness of ignorance which is responsible for the present European cataclysm, ignorance alike of the elemental principles of sociology and current European politics. Does anyone for one moment suppose that the masses of the Central Empires would have entered upon the present struggle so light-heartedly if they had understood the actual situation as the author of "J'Accuse" e.g., understands it? Or if they had realised that hundreds of thousands of their numbers were to be slaughtered and broken without any resultant advantage to the survivors? Again, was it not ignorance—tragic ignorance—on the part of their rulers which allowed them to force on the war? They miscalculated, they displayed stupidity—they lacked *enlightenment*. Had they *known* the forces they were stirring up against themselves, we may be quite sure they would not have been guilty of what must ever rank as one of the greatest crimes in history.

A factor which we may reasonably hope will tend to make wars less frequent is the growth of democracy. The trend of political development among the most enlightened nations is towards a moderate, sane Socialism—a system of government which, while giving individualism fair scope, shall tend to equalise the present social inequalities. The political power of the masses will then steadily increase, and provided they be properly educated they may safely be trusted to use their power wisely. And when the informed masses of the different nations are brought together through accredited leaders and are thus enabled to act coördinately, they, realising how much they have to lose and how little to gain by warring against one another, may be expected to insist that international disputes shall be adjusted on lines of justice and common-sense.

Commercial competition constitutes an important cause of warfare; naturally each nation tends to do the best for itself commercially. Hence has arisen the pernicious system of tariffs by which each nation strives to encourage its own industries at the expense of those of other nations, and this artificial bolstering-up of home industries sets artificial boundaries between the nations and is a perennial source of jealousies, frictions, and quarrels. An infinite benefit would be conferred upon the world at large by a removal of these artificial barriers and by the adoption of free trade all round. Not only would this do away with the immense amount of delay and inconvenience necessitated by the collection of duties; not only would it facilitate international intercourse and liberate armies of officials engaged in unproductive labour for employment profitable to the State, but, most important of all, it would remove what is perhaps the chief cause of warfare.

The establishment of a United States of Europe trading among themselves as do the United States of America, without any harassing restrictions, has surely been the dream of everyone who has thought seriously over the social future of the peoples of Europe. Under such a system each State should as far as possible be constituted with due regard to race, history, and popular vote; each should be allowed to govern itself in its own way without any unwise interruption of historical continuity or any undue breaking away from tradition, and no State should arrogate to itself precedence over any other. The fighting force of each State should be no larger than would suffice for the maintenance of internal order, and all plant for the manufacture of weapons other than those needful for this purpose should be scrapped. There would thus be an end of artillery—light and heavy—quick-firing guns, bombs, mines, and the like. The sole firearm remaining would be the rifle which, being used for sport, could not well be discarded. Needless to say that with these restrictions, aerial and submarine warfare would die a natural death, while warfare by sea and land, if it did occur, would be infinitely less disastrous than at present—though quite as efficacious. (I may remark by the way that aerial warfare bids fair to eliminate all other forms. What naval or military base could withstand the bombardment of 50,000 aeroplanes? Only subterranean chambers are safe from serious aerial attack.) Any breach of the covenant by a State, or any dispute between one State and another, should be referred to a supreme tribunal constituted of delegates from each State.

I am aware, of course, that at the present time such a scheme is purely visionary: it is but a dream, yet it is one that we may well strive to make a reality.

Postscript.

Considerations of space have prevented me from dealing with many aspects of my subject. One of these relates to fear. Is it not wonderful that so many millions of men are capable of mustering sufficient courage to face the terrors of modern warfare? Courage is an asset of inestimable value.

> Cowards die many times before their deaths;
> The valiant never taste of death but once.

We as medical men are familiar with the pathophobiac who pays us periodical visits in order to be assured that there is nothing the matter with him, and of the man who smilingly meets a lingering death from cancer of the larynx. One of the unhappy effects of modern warfare is that it tends to preserve the timid at the expense of the brave, thus lowering the racial level of courage. The brave man seeks out danger, the timid man avoids it, and there are many ways of evading dangerous service and of minimising risks.

The liability to fear may be so great as to be pathological. One of this temperament is apt to become the victim of morbid fears—fears having no adequate objective cause. Claustrophobia is such a fear. I am led to refer to it here because the conditions of modern trench warfare are specially calculated to call it forth, and also because Dr. W. H. R. Rivers has recently related an interesting case of this disease in the pages of this journal.[1] My interest in claustrophobia was roused many years ago by a family of claustrophobiacs, and since then I have had the opportunity of studying several cases.

Those who display a constitutional morbid tendency to fear—the congenital phobiacs, as we may term them—constitute a definite class of psychasthenics. What particular form their fear, or fears, shall take depends very largely upon chance circumstances, but claustrophobia, like the fear of the dark and other instinctive fears, tends to be inherited as such, as I have several times observed. This morbid fear appears to be an exaggeration of a normal instinct—the dread of capture, or of anything which interferes with bodily freedom. It will be remembered that one of Lear's wicked daughters, in her endeavour to outbid her sisters for the father's goodwill, could think of no more precious possessions than "eyesight, *space*, and *liberty*."

In the family referred to the father, several of the children, and some of the grandchildren have displayed well-marked claustrophobic tendencies, and I have satisfied myself that in each case the fear has arisen independently, and that mutual suggestion has played no part in the pathogenesis. One of the sons has not travelled for 30 years in a train; another son, at the age of 50, suddenly developed panic while travelling in the Tube, and has had to give up that mode of travelling.

I would take this opportunity of advancing two propositions bearing upon the pathogenesis and treatment of psychasthenia.

1. The essential feature of all the phobias met with in psychasthenia, and, indeed, of all forms of genuine psychasthenia, is a congenitally defective mental temperament—an abnormality in the realm of feeling tone. How far this depends upon defective cerebral organisation (e.g., of the paleo-thalamus, the probable centre of feeling tone), or how

[1] THE LANCET, 1917, ii., p. 237.

far upon the composition of the blood plasma, need not now be considered.

2. Mental temperament is inborn, and but little susceptible of being altered. A person is born with a certain temperament for which he is no more responsible than for the shape of his nose, and this inborn temperament tends to remain fundamentally the same throughout life, resisting almost completely all attempts, educational or psycho-therapeutical, to modify it. No doubt some of his emotional disposition can be modified by training—an artistic aptitude can be developed by constant exercise, a bad temper bettered by systematic control—yet the native temperament remains, fundamentally unchanged. A person's temperament never in fact, undergoes a decided change except as the result of the normal cyclical changes, such as puberty and senility, or in consequence of disease, such as Graves's disease, myxœdema, or actual insanity. We meet a man we have not seen for years, and when we come to speak to him it is as if we were carrying on a conversation of yesterday, so conscious are we of his unaltered temperament; and it is this which constitutes the essence of the man, or, as we say, his personality. There are the same old gestures, the same old tricks of speech, the same old play of facial expression, all indicative of the same temperament. Contact with the world, his successes, his failures, his troubles, have no doubt left their impress. Youthful ardour may have been damped; the optimist may have lost some of his hopefulness; the shy man may have grown bolder; the genial man may have become somewhat soured, the cheery nature more subdued; but all such changes are on the surface only. When we come to probe below the surface we shall find that the temperament remains fundamentally the same: the very sensitive, the very shy, the very timid, the irrepressibly self-confident, remain sensitive, shy, timid, self-confident to the end of the chapter.

Now if the foregoing propositions are sound—if a congenitally morbid mental temperament constitutes the basis of classical psychasthenia, and if temperament is all but insusceptible of being changed—the limitations of psycho-therapy in psychasthenia are apparent. If we cannot alter feeling tone, strike at the foundation upon which the whole superstructure of psychasthenia is built up, we cannot cure the affection. In my experience the congenital psychasthenic remains psychasthenic to the end. I am far from saying that psychic treatment is wholly useless for these patients. Much can be done to establish a sane habit of thought and to discipline morbid feeling tone, even though this remains essentially the same.

As to the legitimacy of the conclusions Dr. Rivers draws from his case I am somewhat doubtful. His patient, one judges from the description, appears to be a congenital psychasthenic with a bent towards claustrophobia. It is, of course, conceivable that but for the early claustrophobic incident the specific fear of closed spaces would never have displayed itself; but everything must have a beginning, and I judge that the experience with the dog happened to be the first opportunity for the display of the specific fear. Thereafter it showed itself on several occasions, and I suggest that these later manifestations would have occurred even in the absence of the initial incident.

My experience of claustrophobia leads me to doubt whether the mere resuscitation of a forgotten experience is capable of dispersing the fear. May not the cure (?) in Dr. Rivers's case be an instance of faith-healing? Do we sufficiently realise the tremendous power of *absolute* belief? If we could convince a person that by jumping off the Monument in a particular way he would plane gently down and alight unhurt below, he would have no kind of hesitation in attempting the experiment. Similarly, if we succeed in implanting the belief that the revival of a forgotten fearful experience will for ever prevent the recurrence of a similar fear, we shall go far to prevent its recurrence. The crucial test would be to observe the effect of the revival without letting the patient know that a cure was expected from it.

SOCIETY FOR THE STUDY OF INEBRIETY.—The seventh Norman Kerr lecture will be delivered by Major W. McAdam Eccles, M.S., M.B., F.R.C.S., R.A.M.C. (T.), on Tuesday, Oct. 9th, at 5.30 P.M., in the Robert Barnes Hall, 1, Wimpole-street, Cavendish-square, London, W., on the subject of "War and Alcohol." The honorary secretary of the society is Dr. T. N. Kelynack, 139, Harley-street, W. 1, to whom acceptances of invitations should be addressed.

Correspondence.

"Audi alteram partem."

THE PHYSIOLOGICAL AND ANTISEPTIC PROPERTIES OF FLAVINE.

To the Editor of THE LANCET.

SIR,—The tone of Dr. C. H. Browning's letter in your issue of Sept. 15th is an unfortunate one. It seems to be more an expression of his wounded feelings than argument against my findings.

He congratulates himself that in his second paper on flavine, which appeared in the *British Medical Journal* on July 21st last, he forestalled me in a number of my experiments. In this matter he may certainly congratulate himself, as my article was in the hands of the censorship authorities weeks before his paper appeared. His experiments, however, were not carried far enough. In connexion with the toxic power of flavine on the leucocytes, he still used as the maximum time of exposure two hours, which is altogether too short to bring out the full toxic effect on the leucocytes, just as it fails to show the maximum bactericidal power. In his first paper he found that flavine 1 in 500 was the highest dilution which in 20 minutes caused marked inhibition of phagocytosis. In his second paper he states that in two hours flavine 1 in 10,000 had little effect on the phagocytic power. I have found that in five hours flavine 1 in 256,000 gives marked inhibition of phagocytosis, while in 24 hours the leucocytes are completely destroyed by a 1 in 2,000,000 dilution.

I have shown in my article that a 1 in 2000 dilution of flavine completely inhibits emigration of the leucocytes. However, in a septic wound treated with flavine 1 in 1000 there is still a more or less purulent exudate. This is capable of two explanations: either the *in vitro* experiment does not represent what happens in the body or the flavine does not come into contact with the leucocytes in the walls of the wound in sufficient strength to prevent their emigration. As we shall see the latter is the more likely explanation.

Experiments cited in my paper show that the purulent discharges from a wound are very potent in "quenching" flavine. The bared surfaces of the wound also have a great affinity for flavine. The following observation illustrates this point. A patient had a cup-shaped wound in the front of his leg following a fracture of the tibia. This depression was about 2 × 1½ × 1 cm. and held about 1½ c.c. of fluid. It was lined with granulation tissue. The hole was carefully swabbed out and washed with normal saline solution until the washings were clear. In the next two hours it had four changes of flavine (1 in 1000) and then it was filled with flavine (1 in 1000) which was allowed to remain for two hours, after which it was removed. The strength of the flavine removed as measured by the colour intensity was 1 in 3500. We see, then, that the granulation tissue-walls of this wound extracted in two hours most of the flavine from the solution applied, and that even after they had been well dyed with four changes of 1 in 1000 flavine during the previous two hours.

The same wound, immediately after I had removed the above-mentioned two-hour sample of flavine, was filled with a fresh supply of flavine 1 in 1000 and left for 15 hours. At the end of that time the walls of the wound were covered with a mucous-like coating which I take to be the same that the distinguished surgeon (name unknown) has commended as "coagulated lymph." On examination this appeared to consist almost entirely of disintegrated leucocytes, a finding quite in keeping with the test-tube experiments on the powerful leucocidal action of flavine.

The original instructions sent out with flavine by the Medical Research Committee, and presumably drawn up by Dr. Browning, stated that it might be employed in conjunction with any of the various techniques recently advocated in wound treatment. In his second paper on flavine Dr. Browning mentions that unsatisfactory results have followed the two-hourly flushing with flavine after the method of Carrel, and he recommends that it be applied on gauze and only the minimum of water should be introduced so that

the discharges of the wound might not be unduly diluted, as the antiseptic acts better in a serous medium. Here, as elsewhere, Dr. Browning seems to assume that in a septic wound the discharge consists only of serum and bacteria. In connexion with the application of flavine on gauze it is of some interest to note the quenching effect of ordinary surgical gauze on flavine. A piece of gauze was taken measuring 11 × 9 centimetres, 16-ply thick, and weighing 5 grammes. This was placed in a small dish and 20 c.c. of flavine, 1 in 1000, was poured on. The gauze was kneaded for a few seconds to distribute the fluid in its interstices and then 12 c.c. of fluid was squeezed out. The colour of this corresponded with a 1 in 5000 dilution of flavine. The fluid was poured back on the gauze and left two hours, after which, on being expressed, it gave a colour corresponding with flavine 1 in 10,000. A similar experiment was done with flavine 1 in 4000 (using the same weight of gauze and the same volume of fluid), and after being in contact with the gauze for five minutes the expressed fluid corresponded in colour to flavine 1 in 128,000. These observations show clearly that the gauze dressing has a very powerful affinity for flavine, and that if gauze is wetted with a solution of flavine and applied to a wound the concentration of the dye which comes out of the gauze is very much less than that which went in. Another very simple method of demonstrating the great affinity of cotton tissues for flavine is to half fill a small test-tube with flavine 1 in 1000 and to press down slowly into it a tight-fitting cotton-wool plug. The first fluid which exudes above the cotton wool will have absolutely none of the yellow colour of flavine. It may be done also by packing tightly a little wool or gauze into a piece of glass tubing and allowing a 1 in 1000 solution of flavine to percolate through it. The first fluid which comes through will have no yellow colour. Using this method, and packing a piece of gauze weighing 0·38 gm. into a tube of a calibre of 6 mm., from a solution of 1 in 1000 flavine 1·3 c.c. of colourless fluid percolated through before any trace of the yellow colour of flavine was noticed. It may be that this action of gauze in reducing the effective concentration of flavine is the cause of the difference between the unsatisfactory results which have followed the application of flavine by irrigation after the method of Carrel and the more favourable results which have followed its application on gauze. Dr. Browning has stated that too frequent applications of flavine may lead to "undesirable cumulative effects on the tissues locally," and in this way he explains the failure of flavine used by Carrel's method. The absorptive action of the gauze would certainly seem to prevent this.

Dr. Browning states: "It appeared to be a hard enough task to demand of an antiseptic that it should not be quenched in a serous medium," and he appears to resent the suggestion that anything further should be asked of an antiseptic. The production of an antiseptic the power of which is enhanced by serum is a very fine achievement, but in the case of flavine this seems to be more than counterbalanced by the ease with which the dye is absorbed by the walls of the wound, by the purulent discharges, and by the dressings.

Dr. Browning objects to my interpretation of the "therapeutic coefficient" as a comparison of the toxicity of a substance to leucocytes with its toxicity to bacteria (acting in serum). Although there can be no doubt from the text of his original article that this was the sense in which he used the term, he insists that it should be applied only to the ratio between the concentration which inhibits phagocytosis by 50 per cent. *acting for 20 minutes in 25 per cent. serum*, and the lethal concentration to bacteria *acting for 24 hours in 80 per cent. serum*. If the term is to be applied only in this limited sense, then "Browning's coefficient" would be an appropriate name; but "therapeutic coefficient" is altogether too ambitious, and implies that the numeral arrived at has some real value in therapeutics.

When I started working with flavine I hoped that I should be able to convince myself that at last we had a really efficient antiseptic for use in septic wounds, and it was with great regret that I found my experimental results could lead me to no other conclusions than the unfavourable ones mentioned in my article.

I am, Sir, yours faithfully,

ALEXANDER FLEMING.

Sept. 24th, 1917.

PURULENT BRONCHITIS:

ITS INFLUENZAL AND PNEUMOCOCCAL BACTERIOLOGY.

To the Editor of THE LANCET.

SIR,—I have read with considerable interest the article as above entitled by Captain Adolphe Abrahams, Captain N. F. Hallows, Dr. J. W. H. Eyre, and Major H. French in your issue of Sept. 8th; nevertheless, in fairness to myself, I should like to have the opportunity of pointing out that their observations contain little that is new and not contained in my "Bacterial Diseases of Respiration."[1] Therein I pointed out (1) how atypical and unlike anything described in the standard text-books of medicine are the majority of cases of bacterial infections of the lower respiratory tract; and (2) how rare it was in my experience for cases of lobar pneumonia to have a sudden onset, or occur, as it were, spontaneously, but that, on the other hand, they were either due to an awakening of a dormant focus of infection in the lung, or to the rapid extension into the chest of an acute nasal or tracheal catarrh, especially when the *B. influenzæ* is associated with the pneumococcus (pp. 103, 104). I also pointed out (p. 105) that

> "The pneumonia supervening on an attack of so-called 'influenza,' this latter being much more frequently a pure pneumococcal or a combined pneumococcal and influenzal infection, is commonly regarded as a fresh superimposed infection by the pneumococcus; this is an utterly erroneous view in the great majority of cases."

On the other hand, when there has been a dormant pneumococcal focus in the lung—parenthetically I may remark that needling of the lung has shown me that sometimes the pneumococcus and *B. influenzæ* are associated at these foci—

> "the factor which above all probably decides the lighting into virulence of the dormant pneumococcus is the incidence of a fresh infection by some other catarrhal micro-organism. Chief among these is undoubtedly the *B. influenzæ*, and it is owing to this fact that an epidemic of influenza is nearly always attended by a greatly raised mortality due to acute pneumonia. At the same time, it must be admitted that a pure invasion of any part of the respiratory tract by the *B. influenzæ* is comparatively rare; there is nearly always some other associated microbe, and this is usually the pneumococcus" (p. 107).

The conclusion of the authors, and also of Lieutenant J. A. B. Hammond, Captain W. Rolland, and Lieutenant T. H. G. Shore,[2] that—

> "the primary invasion of the lung tissues is by the *B. influenzæ*, and that pneumococci, present at the same time, are at first of low virulence; that the earlier symptoms seem to be attributable to a *B. influenzæ* toxæmia; and that exaltations of the virulence of the pneumococci by symbiotic growth with the *B. influenzæ* would appear to follow"—

is therefore a misconception of the process and only a partial statement of the truth, especially in view of the experiments I adduced (p. 32) to show how potent is the effect of the presence of other bacterial toxins (pneumococcal, staphylococcal, streptococcal) upon the rate of multiplication of the *B. influenzæ*. At the same time, I am prepared to admit that the *B. influenzæ* may be a potent factor in raising the virulence of the pneumococcus.

I have been studying closely for nearly 15 years both the clinical aspects and bacteriology of the respiratory tract, and have been much struck by the gradual increase, especially during the last four years, in the severity of these bronchitic and pneumonic attacks, and I can assure the authors that the condition they describe has not been confined to the Aldershot military area nor even to the military as apart from the civilian population. I have had large experience of it in private practice and among the New Zealand troops at Codford and Hornchurch. So certain was I that a culmination would be reached last winter that I strongly advised the D.D.M.S., N.Z.E.F. in England that a special chest hospital should be established, and predicted a very high rate of incidence among our troops at Codford, which he subsequently informed me had been exceeded. The mortality rate at Aldershot was, I believe, exceeded among the New Zealand troops at Codford. The severe epidemics of pneumonia which have ravaged Guatemala city for years (p. 104) have, I am informed, a mortality rate of 40 per cent. It is highly probable that the grouping together of large numbers of men in huts and marquees tends both to raise the rate of incidence and mortality

[1] Bacterial Diseases of Respiration and Vaccines in their Treatment. 1913. H. K. Lewis.

[2] THE LANCET, July 14th, 1917 (p. 44).

rate, but, as I have stated, the condition freely existed before the war and has been quite common among the civilian population.

Hammond, Rolland and Shore[3] are also in error when they conclude that vaccine treatment is not likely to be of great benefit. I have treated many score of cases with vaccines and have found them to be a sheet-anchor, but they should be used as early as possible and before the finer bronchioles are blocked with exudate. Antiphlogistine I have found to increase the patient's comfort, especially if combined with the use of medicated steam. Mustard plasters, repeated as often as necessary, also help.

Three further points I should like to discuss (1) prophylaxis, (2) after-treatment, and (3) assessment of the future military value of sufferers from this condition.

As regards prophylaxis, this largely hinges upon the prior recognition of cases that have dormant foci in their lungs. These foci are nearly always situated in an area limited internally by the nipple line, externally by the anterior axillary line, above by the fifth rib, and below by the eighth rib. They may usually be heard by means of the stethoscope on very deep respirations being taken, often they can only be elicited post-tussically, occasionally they can only be heard 8 to 16 hours after the administration of a dose of vaccine containing 100 million pneumococci and 200 million *B. influenzæ*. Prophylaxis in these cases is by means of a suitable vaccine; at weekly intervals beginning in September and January of each year the following doses should be given: 100 millions, 250 millions, 250 millions, 500 millions, 500 millions pneumococci and twice as many *B. influenzæ*. In individual cases these dosages may require modification.

If prophylactic inoculation be employed it should be confined to those who have been shown to possess the foci I have described, and perhaps extended to those who are especially susceptible to bronchial and pulmonary infections. This is rendered necessary by the varied nature of the inoculations which the allied forces already receive. The general incidence rate may be much diminished, as I have been convinced by my experiences at Hornchurch, both among those who have infected foci and those who have not, by subjecting the whole camp, officers and men alike, to disinfection of the upper respiratory tract on each of three successive days by means of the chloramine or zinc sulphate atomiser, as at present employed in the case of meningococcus carriers.

As regards after-treatment, this also is by means of vaccine, and greater attention should be paid to the conditions of life under which these men have to live; in my experience only about 50 per cent. ever become quite well again.

Finally, as regards the future value of these cases as fighting units: for some time every case of respiratory disease in the New Zealand Force passed sooner or later under my care, and in many instances I found myself placed in an awkward position. In a certain percentage (about 10 per cent.) there was not the least chance of the men ever becoming fit for active service again. Do what I would I could not eradicate foci, and the first onset of wet and cold sufficed to stir them up into activity. These men were boarded out of the force. In a further percentage (30 to 40) the foci appeared to clear up under vaccine and other treatment, but this clearance was, I feel sure, more apparent than real. Pronounced malaise, tachycardia and intermittence of the heart's action, neuritis, myalgia, and gastric disturbances were some of the sequelæ, which may persist to a greater or less degree for many months. Close observation of these men after graduated exercises is necessary to determine their future value to the Army. The remainder made good recoveries, but convalescence was nearly always slow, and subsequent training had to be carefully graduated.

I am indebted to Lieutenant-Colonel D. S. Wylie, C.M.G., officer commanding No. 1 New Zealand General Hospital, Brockenhurst, for his kind permission that these notes should receive publication.

I am, Sir, yours faithfully,

R. W. ALLEN,
Captain, N.Z.M.C., No. 1, New Zealand General Hospital, Brockenhurst, Hants.

Sept. 18th, 1917.

[3] THE LANCET, July 14th, 1917 (p. 44).

PEPSIN *VERSUS* NECROSED TISSUE.

To the Editor of THE LANCET.

SIR,—Nothing retards the healing of a wound so much as the presence of necrosed tissue. This is removed normally, though with deplorable slowness, by the digestive (tryptic) action of the leucocytes, and I venture to propose a method which would be infinitely quicker than this. I do not myself practise surgery; but I see a great many claims for injury under the Workmen's Compensation Act and otherwise, and I have repeatedly noticed how, owing to the presence of a deep-seated area of necrosed flesh or tendon, the disablement is prolonged and, in some cases, septicæmia results. The number of such cases in the present war must be enormous. When the area is near the surface the remedy is the knife, but this falls upon the just and the unjust. Were it possible to confine the removal to the dead tissues the living remainder might improve the final result. Many a deep-seated and otherwise harmless bullet, too, must be surrounded by dead flesh, which not only prevents the healing of the sinus but imperils the patient's life.

Now the phenomenon of peptic ulcer proves that the gastric juice will digest tissue that is dead without involving that through which the blood still circulates, and I propose that the lesson should be applied to contused wounds of a few days' standing if a slough is suspected. The best technique can only be evolved from experience, but I feel sure that excellent results will be obtained by the following methods. In the case of a sinus leading perhaps to a bullet the wound is first thoroughly well syringed with boiled water; the patient, or his limb, is then placed so that the orifice of the sinus is uppermost and glycerine of pepsin is slowly and interruptedly injected either directly or through an elastic catheter or drainage-tube, which is gradually withdrawn while still syringing. The orifice is then sealed up with strapping covered with cotton-wool, oiled silk, and a lightly applied bandage, and left for four hours, precautions being taken to prevent the temperature from falling. At the end of this period digestion will have done its work, though possibly a repetition may be necessary. The strapping is therefore removed and the sinus forcibly syringed out with boiled water. In the case of superficial sloughs, which may or may not enclose islets of still living flesh, three or four thicknesses of unmedicated lint well soaked with glycerine of pepsin, or perhaps a mixture of pepsin and water, are laid lightly over the part and covered up as before, the dressing being renewed every four hours, after pouring water upon the wound from a height.

I have never heard of this method of treatment, nor do I find any reference to it in books; but, even if it have been already tried, the present war gives opportunities that never existed before, and I plead for a further trial. I hope that those who put it to the test will find time to communicate their results to the journals.

I am, Sir, yours faithfully,

RALPH W. LEFTWICH, M.D., C.M., M.R.C.S.

Ebury-street, S.W., Sept. 24th, 1917.

THE APPLE IN THE DIETARY.—The Government Order restricting the importation of American and Canadian apples into this country is regrettable since the wholesomeness of the fruit is well recognised. A partial fruit diet is consistent with a healthy action all along the line of the alimentary canal, and one of the best fruits for the purpose is a sound apple. It is stated that if this order is not withdrawn there will be no apples obtainable as soon as the home supply is exhausted, which is about the end of November, and many people who enjoy eating an apple and find it a healthy auxiliary to their dietary will probably have to forgo these advantages. While the apple possesses a limited nutritive value of direct importance, the peculiar dispensation of its acids, salts, pectins, sugars, and tissue renders it a very wholesome adjunct to diet and one which undoubtedly contributes to healthy metabolism.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

Died of Wounds.

Capt. W. J. Evans, R.A.M.C., attached Gloucester Regiment, received his medical education at University College Hospital, qualified in 1916, and joined up forthwith.

Wounded.

Capt. A. Morris, R.A.M.C., attached Royal Warwick Regt.
Capt. B. N. Murphy, M.C., R.A.M.C., attached Coldstream Guards.
Capt. A. Willatt, R.A.M.C., attd. Northumberland Fusiliers.
Capt. D. E. Scott, R.A.M.C., attd. Dublin Light Infantry.
Capt. C. H. L. Rixon, R.A.M.C., attd. Sherwood Foresters.
Major J. H. Dixon, R.A.M.C.
Capt. A. Gaston, R.A.M.C., attd. South Staffordshire Regt.
Capt. F. F. Dunham, Canadian A.M.C.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported :—

Lieut. A. F. V. Stephenson, Gordon Highlanders, died of wounds, younger surviving son of Dr. W. Stephenson, Emeritus Professor of Midwifery, University of Aberdeen.
Lieut. M. W. von Winckler, Middlesex Regiment, killed in action, only son of Dr. W. J. von Winckler, of Georgetown, British Guiana.
Capt. O. Thomas, Welsh Horse Yeomanry, died of cardiac failure, second son of the late Dr. J. L. Thomas, of Southampton.
Lieut.-Col. A. G. Johnson, Royal Artillery, killed in action, eldest son of the late Dr. J. Johnson, of Tunbridge Wells.
Lieut. C. S. Workman, M.C., Cameronians and Royal Flying Corps, died of wounds, younger son of Dr. C. Workman, of Glasgow.
Major R. D. Harrisson, D.S.O., Royal Field Artillery, killed in action, only child of Col. D. Harrisson, A.M.S., of Liverpool.

MENTIONED IN DESPATCHES.

The names of the following medical officers are mentioned in the despatches detailed :—

From Vice-Admiral Sir R. E. Wemyss, K.C.B., C.M.G., M.V.O., dealing with the operations of H.M. gunboats in Mesopotamia from December, 1916, to March, 1917—

Surg. J. C. Kelly, R.N., H.M.S. *Tarantula.*
Attended to wounded whilst fire was at its hottest in an exposed position.

Surg. James P. Shorten, R.N., H.M.S. *Mantis.*
Continued to dress and attend to the wounded in the open while under very heavy fire.

Surg. Frederick G. E. Hill, R.N., H.M.S. *Moth.*
Finding a man wounded on the battery deck, he gallantly, under heavy fire, carried him into the sick-bay to dress his wounds. Whilst doing this the man received another wound through his throat, and Surgeon Hill himself received a nasty wound in his forearm. Nevertheless, although in considerable pain and until his arm became too stiff to use it, he proceeded to dress and attend to all the wounded on board.

Temp. Surg. Robert G. Elwell, R.N., H.M.S. *Gadfly.*
Rendered valuable service under fire on many occasions.

Staff-Surgs. Thomas W. Jeffery, R.N. (H.M.S. *Proserpine*), and George W. Vickery, R.N. (H.M.S. *Dalhousie*).
Recommended for good services at the base, which contributed largely to the successful operations.

From Lieutenant-General A. R. Hoskins, C.M.G., D.S.O., Commander-in-Chief, East African Force, dated March 14th—

Lieut.-Col. R. L. Girwood, S.A. Medical Corps; Major E. T. Harris, I.M.S.; Temp. Lieut.-Col. A. D. Milne, East African Medical Service; Lieut.-Col. H. W. Vaughan-Williams, S.A. Medical Corps.

From the Governor of Nyasaland (Sir G. Smith) and Brigadier-General Northey, C.B., dated March 10th, dealing with the operations of the Nyasaland-Rhodesia Force—

Temp. Lieut.-Col. H. H. Y. Hearsey, P.M.O., Nyasaland Government, Director of Military Medical Services; Major D. M. MacGregor, S.A. Medical Corps; Temp. Major H. S. Stannus; Capt. (temp. Major) W. F. L. A. Holcroft, S.A. Medical Corps; Surg.-Capt. R. S. White, Northern Rhodesia Medical Service; Surg.-Capt. R. R. Murray, Northern Rhodesia Medical Service; Surg.-Capt. A. F. Wallace, Northern Rhodesia Medical Service; Surg.-Capt. R. Bury, Nyasaland Field Force; Surg.-Capt. J. W. Bouwer, S.A. Medical Corps; Surg.-Capt. W. J. Sheehan, Northern Rhodesia Medical Service; Surg.-Capt. E. Storrs, Northern Rhodesia Medical Service; Capt. M. G. Sanderson, Nyasaland Field Force; Capt. R. L. Lloyd, M.C., S.A. Medical Corps; Capt. A. P. M. Anderson, S.A. Medical Corps; Capt. A. W. Forrester, Rhodesia Medical Service; Temp. Lieut. P. A. Lister-Smith, Nyasaland Field Force.

THE HONOURS LIST.

The following awards to medical officers are announced :—

Distinguished Service Order.

Surg. Frederick G. E. Hill, R.N.

Distinguished Service Cross.

Surg. James C. Kelly, R.N.
Surg. James P. Shorten, R.N.
Surg. Robert G. Elwell, R.N.

FOREIGN DECORATIONS.

Belgian.

Ordre de Léopold—Officier : Lt.-Col. (temp. Col.) J. D. Alexander, D.S.O., R.A.M.C. *Chevalier :* Capt. T. F. Corkill, M.C., R.A.M.C.; Temp. Capt. J. H. H. Pearson, R.A.M.C.

Ordre de la Couronne—Grand Officier : Surg.-Gen. Sir A. Keogh, G.C.B., Director-General, A.M.S. *Commandeur :* Surg.-Gen. Sir W. Donovan, K.C.B., Maritime Transport; Surg.-Gen. Sir T. P. Woodhouse, K.C.M.G., C.B., Director of Medical Department, Shipping Line. *Officier :* Lt.-Col. (temp. Col.) H. P. W. Barrow, C.M.G., Deputy Assistant Director-General, A.M.S.

French.

Légion d'Honneur—Grand Officier : Surg.-Gen. Sir A. Keogh, G.C.B., Director-General, A.M.S.

THE SUBSTITUTION OF AMERICAN DOCTORS FOR CIVIL MEDICAL PRACTITIONERS IN MILITARY HOSPITALS.

At the meeting of the Central Medical War Committee on Wednesday last this important subject was considered in connexion with a memorandum submitted by the chairman of the Committee. The situation having been thus explained to the Committee and debated by them, it was decided that a representation should be made to the Director-General of the Army Medical Service asking that the Committee should be consulted on all matters affecting civilian medical men. The statement in the lay press that the process of substitution, as far as it has gone, was in accordance with the expressed wishes or views of the Central Medical War Committee was entirely erroneous.

SWEATERS.

We have received the following letter from Mr. John Penoyre, and feel sure that our readers will bring its contents before their patients and friends at all opportunities :—

Are your good readers going to prove good friends to "Sweaters" again for this the fourth winter of the war? We have made a good start with 10,999 comforts sent me as the result of a summer knitting appeal. The sweaters and other things have outgrown this garret, so will your readers kindly address the sacks and parcels to me, care of Sir Edward Ward, D.G.V.O., 45, Horseferry-road, S.W.1. They will have heard all about Sir Edward's Central Pool of Comforts with its bases on every front, from which officers can draw direct for exactly what their men need. Waste and delay are thus avoided, but it is a point of honour for us all to keep these base depôts well supplied throughout the winter. I know all about the wool difficulty, but we can but do our best and be of good cheer, bearing in mind that this may be the last winter of the war.

I have here at 8, King's Bench Walk, Temple, E.C.4, plenty of easily knitted printed patterns of all comforts, for any ladies who like to write for them. They are, of course, free, but it is considerate to enclose stamps to cover postage.

THE RED CROSS EMBLEM.—In order to prevent the improper use of the Red Cross emblem on privately-owned motor-cars and other vehicles, a notice has been issued by the Secretary of the War Office stating that owners of all vehicles who desire to obtain permission to display the emblem must make application through the headquarters of the command by which their cars are employed. The application will be forwarded to the War Office and the necessary permit issued, if the car in question fulfils the following conditions: (1) That it is used solely for the conveyance of sick and wounded soldiers; and (2) that it has been placed at the disposal of the military authorities for this purpose.

URBAN VITAL STATISTICS.

(Week ended Sept. 22nd, 1917.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 17,000,000 persons, the annual rate of mortality was 11·1, against 11·1 and 10·6 per 1000 in the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was also 11·1 per 1000, while among the remaining towns it ranged from 2·1 in Swindon, 3·1 in Reading, and 4·0 in Cambridge to 17·9 in Wimbledon, 21·5 in Gateshead, and 21·9 in Stockton-on-Tees. The principal epidemic diseases caused 470 deaths, which corresponded to an annual rate of 1·4 per 1000, and included 344 from infantile diarrhœa, 39 from diphtheria, 38 from whooping-cough, 35 from measles, and 7 each from enteric fever and scarlet fever. The deaths from diarrhœa, which had been 312, 320, and 262 in the three preceding weeks, rose to 344, and included 90 in London, 27 in Liverpool, 17 in Sheffield, 16 in Manchester, and 12 each in Hull and Newcastle-on-Tyne. The 732 cases of scarlet fever and 1082 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 49 and 45 above the numbers remaining at the end of the previous week. Of the deaths in the 96 towns, 107 resulted from violence. The causes of 25 deaths were uncertified, of which 3 were registered in Liverpool and 3 in Bootle.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality was equal to 11·6, against 12·6 and 10·8 per 1000 in the two preceding weeks. The 257 deaths in Glasgow corresponded to a rate of 12·0 per 1000, and included 24 from infantile diarrhœa, 6 from whooping-cough, 3 from diphtheria, and 1 each from measles and scarlet fever. The 64 deaths in Edinburgh were equal to an annual rate of 10·1 per 1000, and included 2 each from whooping-cough and infantile diarrhœa, and 1 from diphtheria.

Irish Towns.—The 127 deaths in Dublin corresponded to a rate of 16·6, or 1·6 per 1000 above that recorded in the previous week, and included 9 from infantile diarrhœa, 2 from whooping-cough, and 1 each from measles and diphtheria. The 109 deaths in Belfast were equal to an annual rate of 14·5 per 1000, and included 7 from infantile diarrhœa, 2 from whooping-cough, and 1 from enteric fever.

VITAL STATISTICS OF LONDON DURING AUGUST, 1917.

In the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases it appears that the number of persons reported to be suffering from one or other of the ten diseases specified in the table was equal to an annual rate of 3·1 per 1000 of the population, estimated at 4,237,387 persons; in the three preceding months the rates were 3·5, 3·4, and 3·5 per 1000 respectively. The lowest rates were recorded last month in Paddington, Kensington, Fulham, St. Marylebone, Holborn, and Battersea; and the highest rates in Finsbury, Shoreditch, Bethnal Green, Stepney, Southwark, Bermondsey, and Greenwich. The prevalence of scarlet fever was less than in any of the preceding months of this year; this disease was proportionally most prevalent last month in Shoreditch, Bethnal Green, Stepney, Bermondsey, Wandsworth, and Lewisham. The Metropolitan Asylums Hospitals contained 615 scarlet fever patients at the end of last month, against 613, 595, and 644 at the end of the three preceding months; the weekly admissions averaged 83, against 92, 83, and 101 in the three preceding months. Diphtheria was considerably less prevalent than in any other recent month; the greatest proportional prevalence of this disease last month was recorded in the City of London, Finsbury, Shoreditch, Bethnal Green, Stepney, Southwark, Bermondsey, and Greenwich. There were 1003 diphtheria patients under treatment in the Metropolitan Asylums Hospitals at the end of last month, against 1048, 1042, and 1070 at the end of the three preceding months; the weekly admissions averaged 122, against 129, 138, and 142 in the three preceding months. The prevalence of enteric fever was below that recorded in either of the two preceding months; this disease was proportionally most prevalent last month in Hammersmith, Chelsea, Stepney, and Deptford. The Metropolitan Asylums Hospitals contained 45 enteric patients at the end of last month, against 31 and 41 at the end of the two preceding months; the weekly admissions during the month averaged 6, against 6 and 7 in the two preceding months. Erysipelas was proportionally most prevalent in St. Pancras, Hackney, Stoke Newington, Shoreditch, and Southwark. The 19 cases of puerperal fever notified during the month included 3 each in Stepney and Wandsworth, and 2 each in Islington and Lewisham. Of the 10 cases of cerebro-spinal meningitis 2 belonged to Battersea; while the 4 cases of poliomyelitis belonged respectively to Fulham, Chelsea, Poplar, and Battersea.

The mortality statistics in the table relate to the deaths of persons actually belonging to the several boroughs, the deaths occurring in institutions having been distributed among the boroughs in which the deceased persons had previously resided. During the five weeks ending Sept. 1st the deaths of 4261 London residents were registered, equal to an annual rate of 10·5 per 1000 of the population; in the three preceding months the rates were 13·9, 12·0, and 10·9 per 1000 respectively. The death-rates last month ranged from 4·7 in the City of London, 7·8 in Woolwich, 8·1 in Wandsworth, 8·3 in Hampstead, 8·5 in Hackney, and 8·7 in Lewisham to 12·1 in Southwark, 12·3 in Stepney, 12·5 in Finsbury, 13·1 in Chelsea, 14·2 in Shoreditch, and 15·1 in Bermondsey. The 4261 deaths from all causes included 476 which were referred to the principal infectious diseases; of these, 59 resulted from measles, 8 from scarlet fever, 35 from diphtheria, 37 from whooping-cough, 15 from enteric fever, and 322 from diarrhœa and enteritis among children under 2 years of age. No death from any of these diseases was recorded in the City of London; among the metropolitan boroughs they caused the lowest death-rates in Chelsea, the City of Westminster, St. Marylebone, Hampstead, Holborn, and Lewisham; and the highest death-rates in Shoreditch, Stepney, Poplar, Bermondsey, and Greenwich. The 59 deaths from measles were 45 below the corrected average number in the corresponding period of the five preceding years; this disease was proportionally most fatal last month in Kensington, Hammersmith, Islington, Shoreditch, Stepney, and Poplar. The 8 fatal cases of scarlet fever showed a decline of 11 from the corrected average number, and included 2 in Southwark and 1 each in Paddington, St. Pancras, Hackney, Lambeth, Wandsworth, and Camberwell. The 35 deaths from diphtheria were 2 fewer than the average; the greatest proportional mortality from this disease occurred in the City of Westminster.

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING AUGUST, 1917.

(*Specially compiled for* THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1916.	Notified Cases of Infectious Disease.											Deaths from Principal Infectious Diseases.									
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhœa and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.	Deaths from all causes.	Death-rate per 1000 living.
LONDON	4,237,387	—	423	581	—	42	1	19	163	10	4	1243	3·1	—	59	8	35	37	15	322	476	1·2	4261	10·5
West Districts:																								
Paddington	130,668	—	8	10	—	2	—	—	5	—	—	25	2·0	—	2	1	—	1	—	5	9	0·7	140	11·2
Kensington	152,144	—	12	10	—	2	—	1	4	—	—	29	2·0	—	4	—	—	1	1	17	23	1·6	161	11·0
Hammersmith	117,965	—	6	17	—	5	—	—	1	—	—	29	2·6	—	3	—	—	1	1	7	12	1·1	128	11·3
Fulham	149,428	—	18	7	—	1	—	—	2	—	1	29	2·0	—	—	—	—	1	—	12	13	0·9	137	9·6
Chelsea	57,298	—	4	4	—	3	—	—	1	—	1	13	2·4	—	—	—	—	—	—	3	3	0·5	72	13·1
City of Westminster	132,853	—	8	21	—	1	—	1	7	—	—	38	3·0	—	—	—	4	—	1	2	7	0·5	117	9·2
North Districts:																								
St. Marylebone	98,573	—	3	9	—	1	—	—	5	—	—	18	1·9	—	1	—	1	1	—	1	4	0·4	99	10·5
Hampstead	81,470	—	—	17	—	—	—	—	1	—	—	18	2·3	—	—	—	—	—	—	1	1	0·1	65	8·3
St. Pancras	196,812	—	16	33	—	2	—	1	11	—	—	63	3·3	—	1	1	2	2	1	9	16	0·8	191	10·1
Islington	309,359	—	38	41	—	3	—	2	14	—	—	98	3·3	—	10	—	1	4	—	17	32	1·1	310	10·5
Stoke Newington	49,776	—	4	6	—	—	—	—	3	1	—	14	2·9	—	1	—	1	1	—	1	4	0·8	54	11·3
Hackney	209,636	—	19	10	—	3	—	—	12	—	—	44	2·2	—	1	1	—	5	1	19	27	1·3	171	8·5
Central Districts:																								
Holborn	38,161	—	—	3	—	—	—	—	2	—	—	5	1·4	—	—	—	—	—	—	1	1	0·3	48	13·1
Finsbury	74,230	—	5	21	—	1	—	—	4	—	—	31	4·4	—	2	—	—	2	—	6	10	1·4	89	12·5
City of London	20,113	—	—	4	—	—	—	—	1	—	—	5	2·6	—	—	—	—	—	—	—	—	—	9	4·7
East Districts:																								
Shoreditch	99,932	—	16	21	—	—	—	—	9	1	—	47	4·9	—	5	—	2	—	—	16	23	2·4	136	14·2
Bethnal Green	115,552	—	25	31	—	—	—	1	6	1	—	64	5·8	—	3	—	1	1	—	8	13	1·2	107	9·7
Stepney	258,396	—	37	53	—	5	—	3	11	1	—	110	4·4	—	8	—	4	3	1	39	55	2·2	304	12·3
Poplar	155,095	—	17	25	—	2	—	—	3	—	1	48	3·2	—	5	—	2	2	—	21	30	2·0	176	11·8
South Districts:																								
Southwark	177,166	—	17	36	—	1	—	1	15	—	—	70	4·1	—	2	2	2	1	—	22	29	1·7	205	12·1
Bermondsey	113,661	—	17	26	—	1	—	—	5	1	—	50	4·6	—	—	—	—	1	2	26	29	2·7	165	15·1
Lambeth	283,729	—	27	33	—	—	—	1	8	1	—	70	2·6	—	2	1	5	—	—	15	23	0·8	296	10·8
Battersea	159,402	—	8	15	—	1	—	—	2	2	1	29	1·9	—	3	—	1	3	1	10	18	1·2	154	10·1
Wandsworth	310,858	—	45	30	—	4	1	3	9	1	—	93	3·1	—	2	1	2	1	1	10	17	0·6	241	8·1
Camberwell	249,749	—	25	25	—	—	—	1	6	1	—	58	2·4	—	—	1	1	3	—	13	18	0·8	239	10·0
Deptford	107,686	—	7	14	—	2	—	1	5	—	—	29	2·8	—	2	—	4	—	—	13	19	1·8	121	11·7
Greenwich	94,452	—	12	26	—	1	—	—	4	—	—	43	4·7	—	2	—	1	—	1	17	21	2·3	93	10·3
Lewisham	162,901	—	22	17	—	1	—	2	2	—	—	44	2·8	—	—	—	—	1	3	4	8	0·5	136	8·7
Woolwich	130,313	—	7	16	—	—	—	1	5	—	—	29	2·3	—	—	—	1	2	1	7	11	0·9	98	7·8
Port of London	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Including membranous croup.

Shoreditch, Stepney, Poplar, Southwark, Lambeth, and Deptford. The 37 fatal cases of whooping-cough were 20 below the corrected average; the highest death-rates from this disease were recorded in Islington, Hackney, Finsbury, Poplar, Battersea, Camberwell, and Woolwich. The 15 deaths from enteric fever were 6 above the average, and included 3 in Lewisham and 2 in Bermondsey. The 322 deaths from diarrhœa and enteritis among children under 2 years of age were 132 below the corrected average; the greatest proportional mortality from this cause was recorded in Kensington, Shoreditch, Stepney, Poplar, Southwark, Bermondsey, and Greenwich. In conclusion, it may be stated that the aggregate mortality in London last month from these principal infectious diseases was 30 per cent. below the average.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

Staff-Surg. P. L. Crosble to be Fleet-Surgeon.

B. Maclean to be temporary Surgeon.

The following appointments have been notified:—Surgeon: J. G. Boal to the *Skirmisher*. Temporary Surgeons: W. A. Mein to the *Victory*; A. W. North to the *Cormorant*; and H. R. Bickerton to the *Liverpool*.

ARMY MEDICAL SERVICE.

Col. B. A. Burnside is retained on the Active List and to be supernumerary.

Temp. Lieut.-Col. A. S. Woodwark to be a Deputy Assistant Director-General (temporary).

Surg.-Gen. Sir Richard W. Ford, K.C.M.G., C.B., D.S.O., is retained on the Active List and to be supernumerary.

TERRITORIAL FORCE.

Surg.-Major W. M. Taylor to be Deputy Assistant Director of Medical Services.

ROYAL ARMY MEDICAL CORPS.

Temp. Capt. Sir Vincent Nash to be temporary Major.

Temp. Major F. E. Crew, Devon. Regiment, T.F., to be temporary Major.

Temp. Capt. A. L. Jones, Canadian A.M.C., to be acting Major while specially employed.

Second Lieut. (temp. Capt.) F. E. Reynolds, Yeo., T.F., to be temporary Captain.

Temp. Lieuts. to be temporary Captains: L. J. Hood, W. Lumsden, F. Jubb, N. Leonard, F. G. Chandler, T. A. Jones, C. T. Galbraith, M.C.

To be temporary Captains: B. C. A. Smith, F. W. Hird, F. E. Daunt, G. R. C. Wilson, S. G. MacDonald, S. Jacob, W. Russell, M.C., H. D. Gasteen, W. Bannerman, S. Oliver, R. E. Walker.

To be temporary Lieutenants: E. F. Wills, F. M. Auld, H. Goodman, T. A. Ross, J. R. McGregor, L. W. Forsyth, H. W. James, T. J. Little, R. T. Stoney, E. A. Bernard, W. D. Sammon, O. G. Evans, A. C. Strain, T. J. Lyons, B. R. Billings, E. S. Ellis, J. R. Liddell, E. L. Clay, J. C. Drysdale, C. L. Birmingham, H. B. Ellison, H. Galloway, F. W. Emery, J. Brown, J. N. G. W. McMorris, N. Garrard, G. G. Macdonald, G. S. Banks, J. P. F. Waters, A. B. S. Todd, C. M. Pennefather, S. A. Day, A. Dixon, J. R. Prytherch, D. A. Tompsett, J. E. Lucas, W. C. Fowler, T. R. Evans, F. O'B. Ellison, J. M. S. Wood, J. T. Hill, C. Peacock, J. H. Fenn, A. S. Wilson, J. C. Mead, A. S. Griffith, T. F. Pugh, A. C. Sharp, J. Lascelles, C. J. A. Woodside, H. Widdas, W. B. Wilson, J. Brierley, N. V. Mitton, A. S. Morley, W. R. Bayne, L. G. Allan, R. B. Kinloch, C. P. Strong, A. E. A. Carver, A. Mills, E. Macmillan, A. Lowndes, R. Montgomery, I. H. Lipetz, T. C. D. Cathcart, W. P. Lowe, C. H. Rippmann, E. L. Holland.

To be temporary Honorary Lieutenants: J. W. Hawthorne, O. H. Stansfield, T. J. Blacksheor, A. O. Raymond, W. H. Braddock, R. Gellatly (whilst serving at Huddersfield War Hospital).

Officers relinquishing their commissions: Temp. Major J. Neilson. Temp. Capts. W. Barkes (and is granted the honorary rank of Capt.), G. C. Anglin, R. Maclean, E. J. Tyrrell (on account of ill-health contracted on active service), D. A. Birrell (on account of ill-health), J. A. R. Lee, A. W. Owen, T. G. Williams, J. Chassels. Temp. Lieut. J. M. Coplans (on account of ill-health contracted on active service, and is granted the honorary rank of Lieutenant).

SPECIAL RESERVE OF OFFICERS.

To be Lieutenants: R. R. Evans (from Manch. University Contingent, O.T.C.), J. Marshall, P. A. O'Brien, J. J. Robertson, R. P. Crawford, and W. F. Kivlichan (from Glasg. University Contingent, O.T.C.), D. C. Buchanan (late Lieut., Res. of Officers), J. M. Savege.

TERRITORIAL FORCE.

Major (temp. Lieut.-Col.) A. Milne-Thomson, relinquishes the temporary rank on ceasing to command a Field Ambulance.

Capt. (temp. Major) B. Alderson to be acting Lieutenant-Colonel, whilst commanding a Field Ambulance.

Capt. (acting Lieut.-Col.) A. C. H. McCullagh reverts to the temporary rank of Major on ceasing to command a Field Ambulance, with precedence as from Jan. 28th, 1915.

Capt. H. B. Low, M.C., to be acting Lieutenant-Colonel, whilst commanding a Field Ambulance.

Capt. (acting Lieut.-Col.) J. S. Manford relinquishes his acting rank on ceasing to command a Field Ambulance.

Capt. A. B. Prosser relinquishes his commission on account of ill-health, and is granted the honorary rank of Captain.

Capt. A. H. Horsfall, D.S.O., to be temporary Major, and is seconded for service overseas.

Capt. A. E. Woodhead, from the Unattached List, to be Captain.

To be Lieutenants: J. Dall, A. S. Sykes.

A. T. Brand (late Surg.-Major, 2nd V.B., East Yorks. Regiment) to be temporary Major in the East Yorkshire Medical Volunteer Corps.

INDIAN SUBORDINATE MEDICAL DEPARTMENT.

By Royal Warrant the honorary rank of Major has been granted to Senior Assistant Surgeons of the Indian Subordinate Medical Department on completion of three years' service in the honorary rank of Captain.

Medical News.

WAR EMERGENCY FUND OF THE ROYAL MEDICAL BENEVOLENT FUND.—At a meeting held in London on July 31st last it was decided to hold a general meeting of the medical profession in October in order to nominate a representative general committee and to discuss the best methods of promoting this appeal. This meeting has now been arranged for Wednesday, Oct. 10th, at the Medical Society's Rooms, 11, Chandos-street, Cavendish-square, W., at 5 P.M. It is hoped that the meeting will be largely attended in order that the appeal may be well supported and made widely known to the medical profession and the public.

OPENING OF THE WINTER SESSION AT THE MEDICAL SCHOOLS.—Most of the London medical schools will begin their winter work on the first day of October, but University College Medical School does not open until Oct. 3rd. There will be no inaugural addresses except at the London School of Medicine for Women, where, as we announced last week, Dr. Louisa Garrett Anderson, C.B.E., will deliver an address on "Ambition." At some of the medical schools a distribution of prizes is announced, Dr. Christopher Addison, Minister of Reconstruction, performing this function at Charing Cross Hospital at 3.30 P.M., and Lady Cicely Gathorne-Hardy at the Middlesex Hospital.

MEDICAL SOCIETY OF LONDON.—The programme of events for the coming winter session has been issued. The opening meeting will be held at 11, Chandos-street, Cavendish-square, W., on Monday, Oct. 8th, at 8 P.M., when the annual (business) meeting will be followed at 8.30 by an inaugural address by the incoming President, Sir StClair Thomson, on The Founder and the Foundation of the Medical Society. Dr. R. Hutchison and Dr. E. I. Spriggs will introduce a discussion on War Bread and its Effects on Health. During the session discussions will be held on Modern Artificial Limbs and their Influence upon Methods of Amputation; The Value and Limitations of Sanatorium Treatment for Tuberculosis; Facial Surgery; and Anæsthetics in War Surgery.

HUNTERIAN SOCIETY.—The autumn session opens with the delivery of the first Hunterian lecture on Modern Antiseptics, by Lieutenant-Colonel Sir Alfred Pearce Gould (Oct. 3rd). Discussions on Medical Classification of Recruits (Nov. 7th) and Nervous Breakdown (Dec. 5th) will be opened by Sir Robert Jones and Dr. Edwin Ash respectively. The second Hunterian lecture on War-time Orthopædic Surgery will be delivered by Sir Robert Jones on Jan. 2nd, and the Annual Oration by Dr. O. K. Williamson on Feb. 20th. The hour in each case is 9 P.M. All members of the medical profession are invited to attend.

BOOKS, ETC., RECEIVED.

BELL, G., AND SONS, London.
British Boys: Their Training and Prospects. Second series. By Colonel M. J. King-Harman. 2s. net.

BUFFARINI, A. GIUDI, Buenos Aires.
Linfadenias en la Infancia. Por el Dr. Juan Carlos Navarro.

FALCONER, JOHN, Dublin.
Transactions of the Royal Academy of Medicine in Ireland. Vol. XXXV. Edited by J. Alfred Scott, M.A., M.D., F.R.C.S.I.

HARE PHARMACY, Calcutta.
Outlines of Hygiene and Public Health for Students, Sanitary Officers, and Practitioners. By Rames Chandra Ray, L.M.S., Member of the Governing Body, Belgachia Medical College, Calcutta.

HOEPLI, ULRICO, Milan.
Congelamenti (Patogenesi e cura). Di Maggre. Medico Casali Piero, Direttore del Servizio Sanitario del Comando Supremo e Capno. Medico Pullè Felice. Prezzo L. 6.50.
Manuale Pratico di Profilassi e Disinfezione per uso de R. Esercito di Dott. Valfredo Chiodi, Capitano Medico, Comandante la squadra di profilassi a disposizione della Commissions Sanitaria Ispettiva dell' intendenza Generale del R. Escerito. Prezzo L. 4.50.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

ALLAWAY, E. E., M.B., Ch.B. Aberd., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Radcliffe District of the county of Nottingham.

EVANS, J. D., M.R.C.S. Eng., L.R.C.P. Edin., Certifying Surgeon under the Factory and Workshop Acts for the Ebbw Vale District of the county of Monmouth.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).
When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BARNSLEY, BECKETT HOSPITAL.—Second Female House Surgeon. Salary £225 per annum, with board, &c.

BIRKENHEAD BOROUGH HOSPITAL.—Junior House Surgeon. Salary £175 per annum, with board, &c.

BLACKPOOL, VICTORIA HOSPITAL.—Female House Surgeon. Salary £250 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

CAMBRIDGE, ADDENBROOKE'S HOSPITAL.—House Surgeon and House Physician. Salary at rate of £300 per annum each, with board, &c.

COLMONELL PARISH, LOWER DISTRICT OF.—Medical Officer. Salary £70 per annum. Vaccination salary £2 per annum.

EDMONTON GENERAL MILITARY HOSPITAL.—Medical Officers. Salary at rate of £1 per day and keep.

EVELINA HOSPITAL FOR SICK CHILDREN, Southwark, S.E.—Clinical Assistants in Out-patient Department (Medical, Surgical, Aural, and Dermatological) for three months.

LEEDS PUBLIC DISPENSARY.—Resident Medical Officer. Salary £200 per annum, with board, &c.

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MANCHESTER EDUCATION COMMITTEE.—Female Assistant School Medical Officer, unmarried. Salary £300 per annum.

MIDDLESBROUGH, NORTH ORMESBY HOSPITAL.—Assistant House Surgeon. Salary £100 per annum, with board, &c.

NORTHERN SANATORIUM AND CONVALESCENT FEVER HOSPITAL, Winchmore Hill, N.—Temporary Resident Assistant Medical Officer. Salary 7 guineas per week.

NOTTINGHAM GENERAL HOSPITAL.—Female House Surgeon for six months. Salary at rate of £250 per annum, with board, &c.

NOTTINGHAM AND MIDLAND EYE INFIRMARY.—Female House Surgeon. Salary £200 to £250 per annum, with board, &c.

OXFORD EYE HOSPITAL.—Resident House Surgeon.

ROYAL BERKSHIRE HOSPITAL.—Senior Resident Medical Officer. Salary £350 per annum, with board, &c. Also House Surgeon for six months. Salary at rate of £250 per annum, with board, &c. Also Second House Surgeon for six months. Salary at rate of £200 per annum if qualified (if unqualified £150), with board, &c.

ST. HELENS COUNTY BOROUGH.—Temporary Assistant Medical Officer of Health. Salary £350 per annum.

SALISBURY GENERAL INFIRMARY.—House Surgeon. Salary £150 per annum, with board, &c.

SHEFFIELD ROYAL INFIRMARY.—Casualty Officer for six months. Salary £150 per annum, with board, &c.

SOUTHAMPTON, FREE EYE HOSPITAL.—House Surgeon. Salary £100 per annum, with board, &c.

SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—House Physician.

WEST BROMWICH DISTRICT HOSPITAL.—Senior House Surgeon, unmarried. Salary £160 per annum, with board, &c.

WEST HAM UNION INFIRMARY, Whipps Cross-road, Leytonstone, E.—Temporary Assistant Medical Officer. Salary £300 per annum, with usual residential allowances.

WOLVERHAMPTON AND STAFFORDSHIRE GENERAL HOSPITAL.—Resident Medical Officer for six months. Salary at rate of £150 per annum, with board, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Barry (Glamorgan).

Births, Marriages, and Deaths.

BIRTHS.

FIELD.—On Sept. 20th, at the Anglo-American Hospital, Cairo, Katherine, the wife of Captain Philip Field, R.A.M.C., of a son.

LOVELL.—On Sept. 24th, at Earl's Court-road, the wife of A. Gordon Haynes Lovell, M.D., F.R.C.S., of Clarges-street, W., of a daughter.

SCOTT.—On Sept. 19th, at The Birches, Bourne End, the wife of S. Gilbert Scott, M.R.C.S., L.R.C.P., of Bentinck-street, London, W., of a son.

MARRIAGES.

COPLANS—ROUND.—On Sept. 22nd, at St. Luke's Church, Cork, Captain E. Coplans, R.A.M.C., to Kathleen Edith, younger daughter of Mrs. Round and the late F. J. Round, of Bournemouth.

M'CORMACK—WARNOCK.—On Sept. 12th, at Drumbo Presbyterian Church, Captain Campbell M'Neill M'Cormack, M.C., R.A.M.C., to Ella Todd, only daughter of the late Rev. Wm. James Warnock, B.A., B.D.

SMITH—PITMAN.—On Sept. 19th, at St. Paul's, Knightsbridge, Colonel Maynard Smith, M.B., F.R.C.S., A.M.S., to Miss Isabel Pitman, daughter of F. I. Pitman, of Braymead, Bray, Berks.

WATSON—ELLIS.—On Sept. 18th, at St. Michael's and All Angels Church, Bramhall, Captain John Watson, R.A.M.C., of Londonderry, to Marjorie, younger daughter of Mr. and Mrs. Arthur Ellis, Coniston, Bramhall, Cheshire.

DEATHS.

LEWER.—On Sept. 18th, at his residence, Wickham, Burley-in-Wharfedale, Yorkshire, Edward Stewart Lewer, M.D., aged 51.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

BACTEROL.

THIS is a disinfectant containing among other things formalin and essential oils compounded at a high temperature. It is prepared in four forms: (*a*) Medical type for medical use, treatment of wounds, &c.; (*b*) general type for general use; (*c*) vaporising fluid for disinfection with the vapour; and (*d*) aeriform type for inhalation.

Bacterol Sterilising Cabinet.—This is a light wooden box or chamber made in various sizes. Bacterol vaporising fluid is vaporised and the vapour is passed into the cabinet in which the articles to be disinfected have been placed. The bacterol is vaporised by a special apparatus consisting of copper coil heated with a blow-lamp. The temperature in the cabinet does not rise above 100° F. The vapour is fatal to bacteria, including anthrax spores, and is a powerful insecticide, killing lice, clothes moth, wood-worm, &c. The cabinet is used by brush manufacturers for sterilising hair for brushes since the occurrence of anthrax caused by shaving brushes, and is employed by the Y.M.C.A. for killing lice and other vermin in bedding and clothing. The vapour has no deleterious action upon clothing, bedding, coloured fabrics, furs, leather, &c.

Isle of Wight Disease of Bees.—Many experienced bee-keepers assert that bacterol is a cure for this disease. Sugar syrup is medicated with bacterol and given to the bees. The hives are sprayed with a 1 in 80 solution of bacterol. For the winter feeding of bees with sugar syrup the Government has set aside 20 tons of sugar. This has been allotted to Messrs. Pascall to deal with. The Board of Agriculture has stipulated that this sugar shall be converted into "candy" and be medicated with bacterol and coloured with a pink dye so as to render it unfit for human consumption. It is placed on the market under the name of "Pink Bacterol Bee Food."

Medical Uses.—For all surgical purposes—for lotions, gargles, sprays, &c. Bacterol appears to be particularly valuable in the local treatment of venereal and other sores and ulcers. The aeriform type is valuable for cutting short catarrhal affections of the respiratory tract. Bacterol is practically non-toxic. It is prepared by Messrs. Menley and James, Limited, Menley House, Farringdon-road, London, E.C.

AILMENTS OF MINOR POETS

HINTS FOR MEDICAL PRACTITIONERS.

To the Editor of THE LANCET.

SIR,—Reference was recently made in THE LANCET to the increased activity of our minor poets. Scarcely a day passes but some new volume of verse makes its appearance. And the average excellence of these little books is commendably high. For the modern singer is, as a rule, well aware of the wisdom of the adage which proclaims brevity to be the soul of wit. He seldom seeks to inflict on us an epic in 12 books or a didactic poem with notes and an appendix. Indeed the fair white margins whereon his lyrics shyly hide themselves are sometimes so expansive that we have to hunt around to find his sonnet with almost as much persistence as an air-pilot tracking down a submarine. And for this we thank him. For very few poets—even of the major variety—are gifted with sufficient emotional opulence to ensure us quantity as well as quality. But there are still occasions when the minor poet, in the exuberance of youth (and sometimes, alas, in the exuberance of age!) not merely "devotes" himself, but "abandons" himself to poetry. Abandonment is bad. In his abandoned state he is in danger not only of losing sight of the paper shortage but also of falling a victim to many regrettable ailments. To assist the medical practitioner in affording relief to such cases the following brief hints will, it is hoped, prove of service.

1. *Heart fractures.*—The sufferer from this complaint will probably describe his condition in lines conveying, in appropriate terms, the following information:—

> "I feel that my heart is breaking,
> Though I try, for your sake, to smile."

When called in to a case like this don't waste time in argument. Clap a stethoscope on the patient's chest and listen. If the heart is breaking there is considerable danger—and not only to the patient. The hearts of minor poets not only "break," they sometimes "burst." Stand clear and take cover if possible. Charge double fees to cover the additional risk.

2. *Inability to die.*—Some poets are fond of declaiming "I could not die in Springtime," or "I could not die in Summer," or "How could I pass on such a night as this?" rhyming "this" (in the next line but one) with "kiss." Cases of this kind should be confronted with

instant proof. Lose no time in prescribing a stiff dose of prussic acid. If the sufferer really finds it impossible to die he will not refuse to take the stuff. And should the action of the potion prove he was misinformed, there will be one minor poet the less. For this you will earn the lyrical gratitude of the other minor poets.

3. *Prolonging the season.*—"With You 'tis always Summer, dearest Friend"; this kind of statement is constantly being made by minor poets. They labour under a delusion. Not even the Summer Time Act has been able to prolong summer. To cure this strange obsession choose the bleakest day of January, take the patient—clad in summer attire—to the house of the "dearest Friend," and persuade him (or her) to sit in the garden for a couple of hours. As soon as the teeth begin to chatter ask whether it is winter or summer. You will certainly receive an accurate, though probably unrhymed, answer.

4. *Seeing angels.*—"Thou art an Angel, O my Love." Such a statement is indicative of mental trouble. Nearly all minor poets mistake their loves some time or other for angels. There is only one way to cure them of this sad mistake. Insist upon the patient marrying the object of his (or her) affections immediately. By this treatment the angelic obsession will gradually become dislodged.

5. *Scalds from kisses.*—When a minor poet ejaculates, "I feel thy burning kiss upon my cheek" you will know that he is in considerable danger. Lose no time in applying to his cheek butter, margarine, train-oil, or any old lubricant you can lay hands on. If after this he still insists that the kiss burnt him you had better commit him to the county asylum.

6. *Ocular stabbings.*—Minor poets are frequently the victims of outrages of this kind. How often do they cry, "Your glance has stabbed me to the core," or words to that effect? If, on being called in, you find that the "core" has really been punctured, get a cycle repair outfit and proceed as you would with a burst tyre. To locate puncture hold the patient under water and watch for bubbles.

7. *Retention of tears.*—Minor poets are not infrequently attacked by a curious affection of the tear-glands, which they express in some such words as the following:—

> "How can I weep when earth and sea and sky
> Are one vast Ecstasy!"

Talk to the sufferer kindly. Point out to him that a spell of bad weather is certain to set in before long, and that these "vast ecstasies" seldom survive the summer. You can also assure him that many people who shed tears at extremely rare intervals have nevertheless lived to a ripe—and even a rotten—old age and died of another complaint in the end. In acute cases insist on the use of onions.

8. *Exchange of diaphragms.*—Was it not Sir Philip Sidney who sang: "My true love hath my heart and I have his"? Minor poets have frequently said the same thing since—only not so well. If called in to attend a case of this nature you will have to proceed cautiously. It is the most difficult thing in the world to determine whether a patient is in possession of his own heart or somebody else's; they are all so alike. And nobody is anxious to give up his heart. Your best plan will be to insist on a thorough examination with X rays and try to determine whether the respective hearts fit. In cases where the patient has a fit there will be no more to be done.

I am, Sir, yours faithfully and apologetically,

Sept. 19th, 1917. R. B. I.

HOSPITAL WORK IN FIJI.

ACCORDING to the Fiji Blue-book for 1916 the population increased during the year by 24,024, and now totals 163,565. The Colonial Hospital, the principal medical institution in the colony, is under the supervision of the chief medical officer, with a resident medical officer in charge, who is assisted by a junior medical officer. The nursing staff consists of a matron, a senior and a junior staff nurse, a graduate nurse, and six probationers. The number of patients treated in 1916 was 1778, of whom 185 were Europeans. There is at Levuka a branch hospital under the charge of the district medical officer, assisted by a European and a native nurse; admissions during 1916 were 483. There are 11 provincial hospitals for the treatment of native Fijians; these are supervised by Government medical officers, and the admissions totalled 5271. There is a lunatic asylum at Suva for the reception of both sexes of all nationalities, with separate accommodation for Europeans. During 1916 there were 38 admissions and 19 discharges, and there were 56 patients at the close of the year. On Dec. 31st, 1916, there were 287 patients in the leper asylum on the island of Makogai, which is under the charge of a medical superintendent, who is assisted by a European medical officer and five European and three Fijian nursing sisters.

WANTED, TRAINING ON A DAIRY-FARM.

To the Editor of THE LANCET.

SIR,—Can any of your readers put me in touch with a farmer of good social position in a southern county who would entertain the idea of taking into his household a young lady who desires to learn dairy-farming?

I am, Sir, yours faithfully,

LEONARD MOLLOY.

3, Brighton-parade, Blackpool, Sept. 19th, 1917.

Edus.—We will attempt to deal with a very disputed subject in an early issue.

Tenax.—We are obliged to our correspondent for a useful letter, but he has omitted to entrust us with his name and address.

Medical Diary for the ensuing Week.

SOCIETIES.

HUNTERIAN SOCIETY, at the Royal Society of Medicine, 1, Wimpole-street, W.

WEDNESDAY.—9 P.M., Hunterian Lecturn:—Lieut.-Col. Sir Alfred Pearce Gould, K.C.V.O.: Modern Antiseptics.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. B. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham); Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).

WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).

THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

METEOROLOGICAL READINGS.

(*Taken daily at 8.30 a.m. by Steward's Instruments.*)

THE LANCET Office, Sept. 26th, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Sept. 20	...	96	65	55	55	57	Fine
,, 21	...	107	67	51	52	55	Fine
,, 22	...	92	65	52	54	57	Fine
,, 23	...	98	69	56	57	60	Fine
,, 24	...	104	72	54	55	56	Fine
,, 25	...	101	74	52	54	54	Fine
,, 26	...	83	66	54	58	61	Cloudy

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

The following journals, magazines, &c., have been received:—Archives of Radiology and Electrotherapy, Archives de Médecine et Pharmacie Navales, St. Thomas's Hospital Gazette, Medical Officer, American Journal of Medical Sciences, Mercy and Truth, South African Medical Record, Clinique Ophtalmologique, Maternity and Child Welfare, Hospital Gazette, Journal de Médecine de Bordeaux.

EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot undertake to return MSS. not used.

Offices: **423, STRAND, LONDON, W.C. 2.**

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Y.—Lieut.-Col. A. C. Yate.

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